DOCUMENT RESUME

ED 453 367 CE 081 763

TITLE	Workplace Essential Skills: Resources Related to the SCANS Competencies and Foundation Skills. Research and Evaluation Report Series 00-B.
INSTITUTION	ACT, Inc., Iowa City, IA.
SPONS AGENCY	Employment and Training Administration (DOL), Washington, DC. Office of Policy and Research.; Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	2000-08-00
NOTE	552p.; This report is based on "Skills and Tasks for Jobs: A SCANS Report for America, 2000." For this report, see ED 350 414.
AVAILABLE FROM	For full text: http://wdr.doleta.gov/opr/fulltext/00-wes.pdf.
PUB TYPE	Guides - Non-Classroom (055) -- Information Analyses (070)
EDRS PRICE	MF02/PC23 Plus Postage.
DESCRIPTORS	*Basic Skills; Case Studies; Check Lists; *Competence; Competency Based Education; *Educational Needs; *Employment Qualifications; Evaluation; Futures (of Society); *Job Skills; Labor Force Development; Literature Reviews; On the Job Training; Postsecondary Education; Secondary Education; Skill Analysis; Skill Development; *Vocational Education
IDENTIFIERS	Crosswalks (Linking); O Net; Secretarys Comm on Achieving Necessary Skills

ABSTRACT

This report summarizes the results of a project conducted to document the skills and behaviors that have been identified as essential for a work force facing the challenges of global competition in an environment of rapidly changing markets. The workplace competencies and foundation skills defined in "Skills and Tasks for Jobs: A SCANS [Secretary's Commission on Achieving Necessary Skills] Report for America 2000" provide the foundation of the report. The report uses the SCANS organizational framework that distinguishes between workplace competencies (managing resources, accessing and storing information, interpersonal situations, understanding systems, and using technology) and foundation skills (basic skills, thinking skills, and personal qualities). The report includes a separate section for each of the SCANS competency areas and foundation skills. Each of these sections includes the following elements: (1) the original SCANS definition; (2) comments from a panel of technical experts; (3) a summary of the review of more than 50 documents; (4) a list of sources; (5) the SCANS scales; (6) SCANS-O*NET (Occupational Information Network) crosswalks; (7) SCANS--O*NET scale anchors and an explanation of how they relate to each other; (8) other O*NET links; and (9) assessment documents. Five appendixes (about half the document) include an annotated list of sources, the complete set of crosswalks developed for the report, a full list of published assessments, case studies that exemplify effective strategies for teaching workplace essential skills, and a list of the technical experts and youth training program professionals who were members of the skills panels. (KC)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 453 367

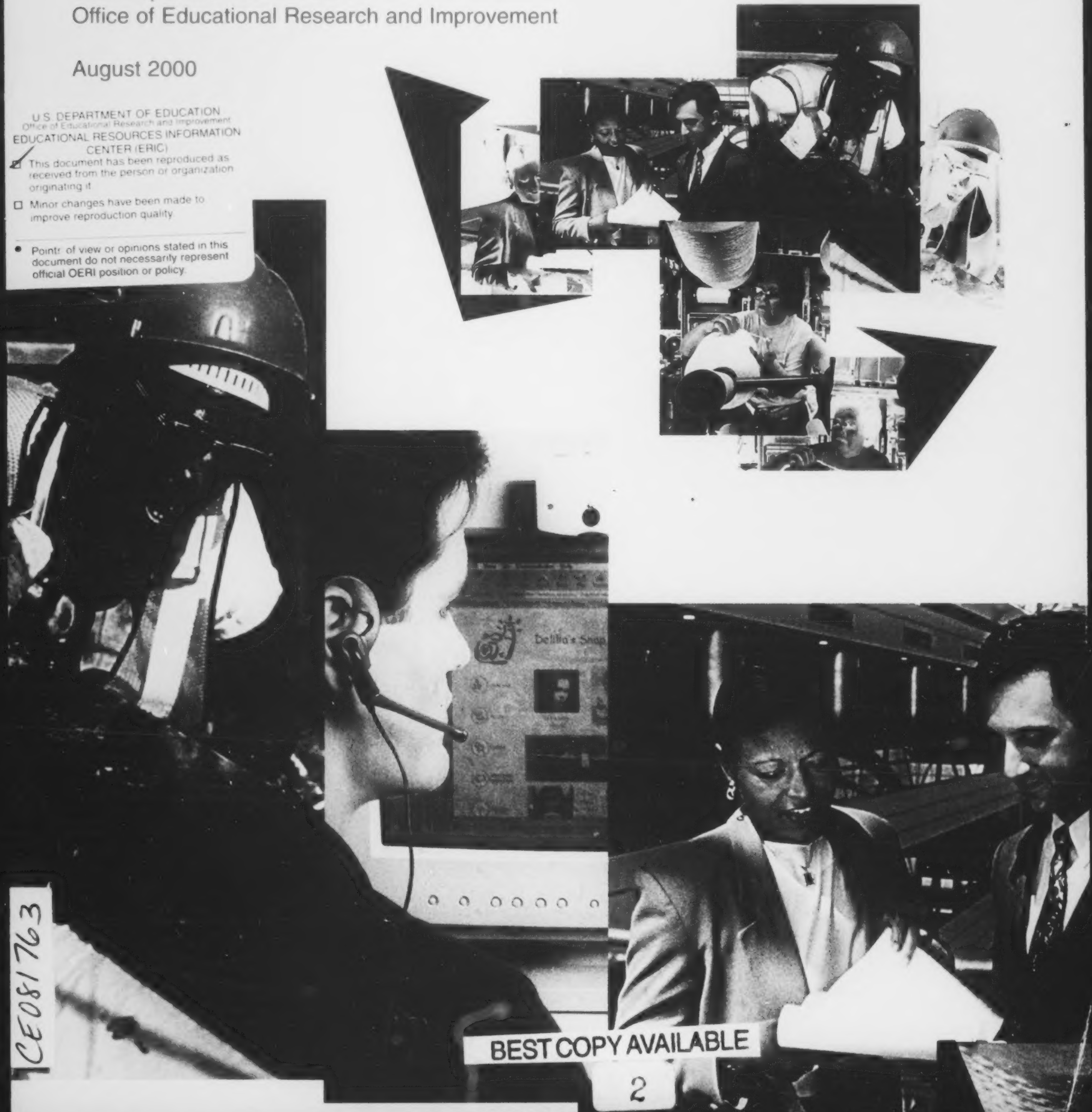
Workplace Essential Skills: Resources Related to the SCANS Competencies and Foundation Skills

Research and Evaluation Report, Series 00-B
U.S. Department of Labor
Employment and Training Administration

U.S. Department of Education
Office of Educational Research and Improvement

August 2000

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.



CE081763

BEST COPY AVAILABLE

Workplace Essential Skills: Resources Related to the SCANS Competencies and Foundation Skills

U.S. Department of Labor
Alexis M. Herman, Secretary

Employment and Training Administration
Raymond L. Bramucci, Assistant Secretary

Office of Policy and Research
Gerard F. Fiala, Administrator

Office of Policy and Research
Robert J. Litman, Deputy Administrator

U.S. Department of Education
Richard W. Riley, Secretary

Office of Educational Research and Improvement
C. Kent McGuire, Assistant Secretary

Office of Vocational and Adult Education
Patricia W. McNeil, Assistant Secretary

National Center for Educational Statistics
Andrew J. Kolstad, Senior Technical Advisor

Office of Vocational and Adult Education
Cynthia L. Brown, Senior Policy Analyst

August 2000

For More Information

Questions or inquiries regarding this report should be directed to:

ACT, Inc.
Workforce Development Division
2255 North Dubuque Road
P.O. Box 168
Iowa City, Iowa 52243-0168
(319) 337-1047

TABLE OF CONTENTS

Preface v

Acknowledgements vi

Executive Summary vii

Introduction 1

Workplace Competencies 9

Resources

Allocates Time 9
Allocates Money 16
Allocates Materials and Facility Resources 22
Allocates Human Resources 29

Information

Acquires and Evaluates Information 34
Organizes and Maintains Information 45
Interprets and Communicates Information 51
Uses Computers to Process Information 58

Interpersonal

Participates as a Member of a Team 64
Teaches Others 71
Serves Clients/Customers 78
Exercises Leadership 84
Negotiates to Arrive at a Decision 90
Works with Cultural Diversity 97

Systems

Understands Systems 100
Monitors and Corrects Performance 108
Improves and Designs Systems 113

Technology

Selects Technology 118
Applies Technology to Task 123
Maintains and Troubleshoots Technology 131

Foundation Skills ... 134

Basic Skills

Reading ... 134
Writing ... 143
Arithmetic and Mathematics ... 154
Listening and Speaking ... 167

Thinking Skills

Creative Thinking ... 180
Decision Making ... 188
Problem Solving ... 193
Seeing Things in the Mind's Eye ... 205
Knowing How to Learn ... 211
Reasoning ... 215

Personal Qualities

Responsibility ... 225
Self-Esteem ... 232
Social ... 236
Self-Management ... 242
Integrity/Honesty ... 248

Bibliography ... 253

Appendix A: Summary of Sources ... A-1
SCANS ... A-3
O*NET ... A-9
AccuVision Workplace Success Skills System ... A-18
AON Consulting Survey of Human Resource Trends ... A-19
Arizona Workplace Skills Standards (Draft) ... A-20
Assessing Literacy in the Workplace ... A-23
ASTD Update: Basic Skills ... A-23
Australia's Key Competencies ... A-23
Basic Skill Requirements for Selected Army Occupational Training Courses ... A-25
Basic Skills in the U.S. Workforce ... A-27
Bottom Line: Basic Skills in the Workplace ... A-29
California Career-Technical Assessment Project (CTAP) ... A-29
Chamber of Commerce and National Association of Manufacturers' Survey ... A-30
Chatham-Savannah Compact ... A-30
Colorado Department of Education ... A-33
Consensus Framework for Workplace Readiness ... A-35
Employability Inventory ... A-38
Employer's Choice in the Job Search ... A-38
Equipped for the Future ... A-39
Fort Worth: Project C^3 ... A-42
Fourth R: Workforce Readiness ... A-43
Framework for Developing Skill Standards for Workplace Literacy ... A-43
Future Work ... A-45
Getting a Job after College - What Skills Are Needed? ... A-46

High School Curriculum Study ... A-47
High Schools and the Changing Workplace: The Employer's View ... A-47
Investing in Our Children ... A-49
Job Skills for the 21st Century ... A-49
Kansas Business Survey ... A-50
Kansas Competency Index of Workplace Skills ... A-50
Kentucky Council on School Performance Standards ... A-51
Mexico's Occupational Analysis Study ... A-54
Michigan Employability Skills ... A-61
National Vocational Qualifications (NVQ) ... A-62
New Standards Project ... A-62
New York State Education Department ... A-64
New Zealand's Essential Skills ... A-65
Norback Job Literacy Structure ... A-65
PLATO Learning System ... A-66
Project BEL ... A-66
Quality of American High School Graduates: What Personnel Officers Say and Do about It ... A-66
Skill Demand, Changing Work Organization, and Performance ... A-67
Survey of Employers in Los Angeles and Torrance, California ... A-67
Survey of San Francisco Employers ... A-67
Teaching the New Basic Skills ... A-68
Texas Workplace Skills Inventory ... A-68
Training America: Strategies for the Nation ... A-68
Vocational-Technical Consortium of States (VTECS)/Illinois ... A-69
Washington Basic Skills ... A-71
Washington Workplace Competency Worksheet ... A-72
Work Keys ... A-75
Workforce Development Region IX Needs Assessment Survey Report ... A-77
Workforce LA ... A-78
Workplace Basics (Carnevale) ... A-78
Young People's Participation in Post-Compulsory Education and Training ... A-79

Appendix B: Crosswalk Tables ... B-1
SCANS to O*NET Framework Crosswalk ... B-3
SCANS Scales to O*NET Scales Crosswalk ... B-20
O*NET to SCANS Crosswalk ... B-31

Appendix C: Assessments ... C-1
Adult Basic Learning Examination, Second Edition (ABLE) 1986 ... C-3
Applicant Review (1996) ... C-5
Basic Achievement Skills Individual Screener (BASIS) 1983 ... C-7
Basic Skills Tests (BST) ... C-9
Comprehensive Ability Battery (CAB) ... C-11
Comprehensive Adult Student Assessment System (CASAS) ... C-13
Cornell Critical Thinking Test, Level X ... C-15
Cornell Critical Thinking Test, Level Z ... C-17
Differential Aptitude Tests®, Fifth Edition (DAT®) 1990 ... C-19
Employee Aptitude Survey (EAS) ... C-21
Flanagan Aptitude Classification Tests (FACT) ... C-23

Flanagan Industrial Tests (FIT) C-26
Industrial Psychology International, Ltd. – Applied Math C-29
Industrial Psychology International, Ltd. – Blocks C-31
Industrial Psychology International, Ltd. – Fluency C-33
Industrial Psychology International, Ltd. – Judgment C-35
Industrial Psychology International, Ltd. – Numerical Proficiency Assessment (NPA) C-37
Industrial Psychology International, Ltd. – Numbers C-39
Industrial Psychology International, Ltd. – Parts C-41
Industrial Psychology International, Ltd. – Reading Comprehension C-43
Industrial Psychology International, Ltd. – Verbal Proficiency Assessment (VPA) C-45
Industrial Psychology International, Ltd. – Workplace Skills Survey C-47
PDI Employment Inventory C-49
Professional Employment Test (PET) C-51
SRA® Reading-Arithmetic Index (RAI™) C-53
TABE (Test of Adult Basic Education) 7&8 Complete Battery C-55
TABE (Test of Adult Basic Education) 7&8 Survey C-58
TABE Work-Related Foundation Skills (TABE-WF) C-61
TABE Work-Related Problem Solving (TABE-PS) C-63
Watson-Glaser Critical Thinking Appraisal®, Forms A and B (WGCTA), 1980 .... C-65
Wonderlic Basic Skills Test (WBST®) C-67
Work Keys® Applied Mathematics C-69
Work Keys® Applied Technology C-71
Work Keys® Listening & Writing: Listening C-73
Work Keys® Locating Information C-75
Work Keys® Observation C-77
Work Keys® Reading for Information C-79
Work Keys® Teamwork C-81
Work Keys® Listening & Writing: Writing C-83

Appendix D: Case Studies D-1
Effective Practices for Teaching Essential Workplace Skills D-3
Part I: Lessons Learned D-5
Part II: Effective Teaching and Training Strategies D-12
Part III: Case Study Summaries D-20
Case Studies D-25
  Work-Based Learning in Boston, Massachusettes D-27
  Horizonte Instructin and Training Center D-40
  Long Beach City College D-48
  North Clackamas School District D-57
  Rural Entrepreneurship through Action Learning D-69
  YouthBuild Rockford D-78

Appendix E: Technical Panel Members E-1

Preface

This report provides the results of a comparison between the workplace basic skills defined by the Secretary's Commission on Achieving Necessary Skills (SCANS) and skill frameworks developed by a variety of national and international organizations. The comparison found a great degree of commonality in the skill definitions. Therefore, the research yielded a comprehensive common language for the discussion and examination of workplace basic skills. The report is intended to serve as a guide for human resources personnel, trainers, educators, and researchers who are interested in workplace basic skills training.

This research also expanded the applicability of the skill definitions by developing behaviorally-anchored scales for each skill. These scales can serve as a common standard and reference point for workers, employers, trainers, educators, and program administrators as they consider work-related activities including the following:

- Identifying the skills and skill levels required for employment
- Approximating the skill levels of current or future workers
- Identifying the skill development that will help match workers to job requirements
- Describing individual skills as part of a job transition process
- Identifying valid assessments for measuring workplace readiness
- Using a hierarchical taxonomy of skills for facilitating the development of individual training plans, and for preparing and developing employment training programs

O*NET is currently being developed by the U.S. Department of Labor to replace the *Dictionary of Occupational Titles* (DOT, U.S. Department of Labor, 1991). Because O*NET is a major framework for describing workplace skills, this report provides crosswalks and links from the SCANS skill definitions and scales to relevant O*NET skill definitions and scale anchors. The O*NET–SCANS crosswalks facilitate an understanding of the features that are shared by the two frameworks and that are central to current U.S. workforce-related educational and training initiatives.

The attainment of workplace readiness skills is a core element of the Workforce Investment Act (WIA). States and local areas are required to provide workforce preparation and training for adults and youth to meet the requirements of WIA Title I, Adult Education and Family Literacy, and Perkins Vocational and Technical Education programs. They need to measure workplace readiness, basic, academic, and technical skills in order to improve programs and support their accountability systems for assessing participant performance. They can use this report as a reliable reference as they develop standards and identify workplace competency assessments.

The synthesis of the workplace essential skill definitions, skill level descriptions, and associated assessments provided in this report, represent a "roadmap" for states that are incorporating workplace readiness skills into their vocational and technical education or adult education programs. Local providers of workforce investment services, vocational and technical education, and adult education will also find these frameworks and assessments useful to their local program development and improvement goals.

Acknowledgements

This report was published in the Employment and Training Administration's Office of Policy and Research (OPR). Arrangements for publication and dissemination will be under the direction of OPR's Dissemination Team: Armelia Hailey, Team Leader, and Andre Robinson. The team is housed in the Division of Policy, Legislation and Dissemination.

Many people contributed to the successful completion of this report. ACT, Inc., would like to thank its current and former employees for their perseverance and commitment during the course of this project.

Ann Stamps White, Project Director
Robert Korte, Project Director
Kevin Johannsen, Development Associate
Melanie Laverman, Development Associate
Gustavo Oropeza Sayago, Development Associate
Lin Wang, Research Assocaite
Jennifer Hicks, Development Associate
Michele Mitchell, Project Coordinator
Anne L. Price, Editor
Jane Peters, Editor
Nancy K. Meier, Administrative Support
Lisa A. Bruegge, Administrative Support
Barb Ciha, Administrative Support

Workplace Essential Skills:

Resources Related to the SCANS Competencies
and Foundation Skills

Executive Summary

The report, *Workplace Essential Skills: Resources Related to the SCANS Competencies and Foundation Skills*, was developed by ACT, Inc., under the direction of the U.S. Department of Labor, Employment and Training Administration, and the U.S. Department of Education, National Center for Education Statistics. The purpose of this project has been to document the skills and behaviors that have been identified as essential for a workforce facing the challenges of global competition in an environment of rapidly changing markets.

Defining the project

Foundation. The workplace competencies and foundation skills defined in *Skills and Tasks for Jobs: A SCANS Report for America 2000*, provide the foundation of this report. Commissioned by the U.S. Department of Labor, SCANS convened in 1990 to identify the skills that American workers needed for job success in a global market, and to create a plan of action to make sure those skills are developed by all citizens. The competencies and foundation skills that resulted from the SCANS study were intended to set the agenda for what students are taught in the nation's schools and how workers are trained and retrained for the high-skill, high-wage jobs of the future. Considering SCANS' roots in the Department of Labor and its prominence in the workforce development field, it was logical to base this study of workplace essential skills on the foundation provided by the SCANS study.

Overview. While the SCANS competencies and foundation skills identify what skills are important and needed, and the SCANS study offers an agenda for teaching and training American workers in the use of these essential skills, there are now numerous other systems for identifying, defining, measuring, and analyzing essential workplace skills. These have grown both rapidly and in many directions, creating the need for a comprehensive overview of products and services related to workplace skills. This report provides that overview. It can, therefore, serve as a resource for organizations and researchers as they proceed to build on the essential skills defined here. It can also serve as an historical reference of the efforts made to date, and how they relate to one another.

Standard language. When comparing the workplace basic skills defined by SCANS, and skill frameworks developed by a variety of national and international organizations, ACT found a great degree of commonality in the skill definitions. As a result, in addition to its usefulness as an overview, this report standardizes the language used for the discussion of workplace basic skills. In this capacity it will serve as a general reference for human resources personnel, trainers, educators, curriculum developers, and researchers who are interested in workplace basic skills training. It can function as a guide for these professionals and others who wish to rely on a taxonomy of skills development when planning courses or other training exercises, or who would like guidance in relating assessments to the skills being taught.

Standard reference points. This research also expanded the general applicability of the skill definitions by developing a behaviorally-anchored scale for each skill. The hierarchical scales operationalize the skill definitions by providing behavioral examples of the skill performance within a skill area. For instance, for the foundation skill, Reading, Level 1 is defined as "Reads simple material such as basic instructions, directories, product labels, menus, phone messages, and signs to be informed or to learn. Level 5 Reading is defined as "Synthesizes specialized or highly technical documents in order to solve problems or perform analysis or evaluation."

For workers, employers, trainers, educators, and program administrators considering work-related activities, these scales can serve as a standardized point of reference for activities such as:

- Identifying the skills and skill levels required for employment
- Approximating the skill levels of current or future workers
- Identifying the skill development that will help match workers to job requirements
- Describing individual skills as part of a job transition process
- Identifying valid assessments for measuring workplace readiness
- Using a hierarchical taxonomy of skills for facilitating the development of individual training plans, and for preparing and developing employment training programs

Workplace Essential Skills: Resources Related to the SCANS Competencies and Foundation Skills was also commissioned to go beyond the identification and classification of the skill definitions to address the following questions:

- What skills are being defined?
- What are the levels of performance for each SCANS skill area defined?
- What features do the SCANS and Occupational Information Network (O*NET)frameworks have in common?
- What assessment tools are available to measure the SCANS skill areas?
- How are exemplary programs providing training for these skills?

Because the report addresses these questions, it also serves as a comprehensive reference for workforce development initiatives.

Using the report

The report uses the SCANS organizational framework that distinguishes between workplace competencies and foundation skills. The workplace competency areas are: managing resources, accessing and storing information, interpersonal situations, understanding systems, and using technology. The foundation skills--basic skills, thinking skills, and personal qualities--are necessary for proficient performance in each of the five competency areas. There is a separate section of the report for each SCANS competency area and the foundation skills required for successful performance within it. Each of these sections includes the following elements:

> *The original SCANS definition.* Each skill section leads with the original SCANS definition as it was published in 1991.
>
> *Panel comments.* A panel of technical experts including business, government, and education professionals was convened to review the information that was gathered during the literature review. Their comments are presented here.
>
> *A summary of the literature review.* More than fifty domestic and international sources that reported on sets of essential skills were included in the literature review. Direct comparisons between the skills were made by grouping them according to the SCANS framework.

A list of sources. Summaries of how a given skill or skill area was defined by a source are included under this heading. The list is an excellent resource for future researchers who may work to organize and define workplace skills.

The SCANS scales. Based on the literature and panel comments, hierarchical behavioral scales for each skill area were developed. The scales can be used for identifying tasks performed by workers in a given job, and when job descriptions and/or training curriculums are in development.

*SCANS–O*NET Crosswalks.* The Occupational Information Network (O*NET) is replacing the *Dictionary of Occupational Titles.* The content model of O*NET is designed to provide a systematic way to collect and analyze occupational information in order to accurately describe the activities, context, characteristic, and requirements of each occupation in the United States. The SCANS to O*NET Crosswalks permit understanding of the O*NET skill definitions and scales as they compare to the SCANS skill definitions and scales, and vice versa. The crosswalks are not intended to replace SCANS or imply equivalence, but to direct users to definitions of similar skill areas.

*SCANS–O*NET scale anchors and how they relate to each other.* Each O*NET skill area contains three scale anchors: High, Medium, and Low. Where a match exists at the definition level, the SCANS scale level definitions were matched to the O*NET scale anchors. However, Level 5 on the SCANS scales does not always correspond to the "High" O*NET scale anchor, and Level 1 on the SCANS scales is not always equal to the "Low" O*NET scale anchor.

*Other O*NET links.* The O*NET categories describe potentially different aspects of workplace skills that are relevant to the SCANS skill areas. Therefore, other possible O*NET links are provided under this heading.

Assessments. After *Tests in Print*, the *Mental Measurements Yearbooks*, and the *ERICA/AE Test Locator* were consulted, a list of assessments was compiled. The assessments listed were designed for youth and/or adult populations, were suitable for nationwide administration, and appeared to be relevant to the SCANS competencies and foundation skills. Major assessment publishers were asked to provide test descriptions and technical information. No attempt to critique the assessments listed in this report was made by ACT or the Department of Labor, so further information should be obtained from the publisher before deciding to use specific assessments.

There are five appendices, as follows:

Appendix A contains a list of sources, with a brief summary of each source. For this list, ACT concentrated on literature that was mainly produced in the last decade. This list is an excellent resource for future researchers who may work to organize and define workplace skills.

Appendix B contains a table showing the complete set of Crosswalks developed for the report, the SCANS to O*NET framework crosswalk, the SCANS to O*NET scale crosswalk, and the O*NET to SCANS crosswalk. The crosswalks provide an alignment of the SCANS and O*NET frameworks and are developed as a resource for those who have adopted SCANS or similar frameworks and need guidance to transition to the new O*NET framework.

Appendix C contains the full list of published assessments that are currently available for use in measuring workplace-related skills. The assessments are listed in alphabetical order. Information presented in the listing includes a description of the assessment; its publisher, and its availability; potential links to SCANS skills; the purposes it might be used for; and technical information.

Appendix D provides case studies that exemplify effective strategies for teaching workplace essential skills. The case study report documents instructional practices that have been effective for helping learners develop and improve essential workplace skills. The case studies present exemplar programs that may serve as models for those working to develop, administer and improve workforce development initiatives.

Appendix E is a list of the technical experts and youth training program professionals who were members of the Workplace Essential Skills Panels.

Through the synthesis of workplace essential skill definitions, skill level descriptions, assessments associated with them, and case studies this report offers a "roadmap" for education and training providers who are incorporating workplace readiness skills into their vocational and technical education or adult education programs. State agencies and local providers of vocational and technical education, adult education, and programs developed under WIA will also find these frameworks and assessments useful to their local program development and improvement goals.

Workplace Essential Skills:

Resources Related to the SCANS Competencies
And Foundation Skills

Introduction

Business organizations have claimed for years that the workplace skill levels of American workers do not meet the needs of rapidly changing markets facing global competition. Before efforts to improve this situation can begin, it is critical to document which skills are needed in existing work environments, which skills will be needed in the future, and at which levels of competency American workers will need to perform. With this key information, policy makers, educators, and businesspeople can set goals to achieve cost-effective improvements in the educational and vocational systems that are expected to produce a quality workforce.

As the concept of defining workplace skills has become accepted, systems for analyzing, identifying, and measuring essential workplace skills have grown rapidly and in many directions. Because of the high demand from businesses and educators for such services and the expanding research being conducted in this area, competing interests have produced a vast number and variety of systems, programs, definitions, and tools. As with other high-demand products, these vary in content and quality, assessment availability, and training innovation and success.

It has been difficult for consumers to evaluate the vast array of products and services and to determine which will be the most appropriate for them. Language has been the biggest barrier. Even in traditional skill areas, such as reading and writing, few groups have agreed on any one definition. Striving for uniqueness, comprehensiveness, or addressing specific needs, many groups have put their own trademarks on the content of skill areas. While each has added new understanding to the definition process, it is difficult to justify valuing any one definition over another. Therefore, there is a real need for a comprehensive overview of products and services related to workplace skills. Such an overview can serve as a resource for organizations and researchers as they build on these definitions in the future, and as a history of the efforts made to date, and how they relate to one another. It can function as a basic resource for trainers, curriculum developers, or other educators who wish to rely on a taxonomy of skills development when planning courses or other training experiences, or who would like further guidance in relating assessments to the skills being taught.

A framework is needed to organize the workplace skills of interest. To date, the Secretary's Commission on Achieving Necessary Skills (SCANS) remains a popular document focused on essential workplace skills. Commissioned by the U.S. Department of Labor, SCANS convened in 1990 to identify the skills that American workers needed for job success in a global market, and to create a plan of action to make sure those skills are developed by all citizens. The competencies and foundation skills that resulted from SCANS (shown in Figure 1) were intended to set the agenda for what students are taught in the nation's schools and how workers are trained and retrained for the high-skill, high-wage jobs of the future. Considering SCANS' roots in the Department of Labor and its prominence in the development of this field, it is logical to use it as the framework for this overview.

Figure 1: SCANS Framework

ESSENTIAL WORKPLACE SKILLS

Workplace Competencies

Resources

Allocates Time
Allocates Money
Allocates Materials and Facility Resources
Allocates Human Resources

Information

Acquires and Evaluates Information
Organizes and Maintains Information
Interprets and Communicates Information
Uses Computers to Process Information

Interpersonal

Participates as a Member of a Team
Teaches Others
Serves Clients/Customers
Exercises Leadership
Negotiates to Arrive at a Decision
Works with Cultural Diversity

Systems

Understands Systems
Monitors and Corrects Performance
Improves and Designs Systems

Technology

Selects Technology
Applies Technology to Task
Maintains and Troubleshoots Technology

Foundation Skills

Basic Skills

Reading
Writing
Arithmetic
Mathematics
Listening
Speaking

Thinking Skills

Creative Thinking
Decision Making
Problem Solving
Seeing Things in the Mind's Eye
Knowing How to Learn
Reasoning

Personal Qualities

Responsibility
Self-Esteem
Social
Self-Management
Integrity/Honesty

Guide to Using the Report

Developed under the direction of the U.S. Departments of Labor, Employment and Training Administration, and the U.S. Department of Education, National Center for Education Statistics, the objective of this project was to document the workplace skills and behaviors that have been identified as essential. This report, *Workplace Essential Skills: Resources Related to the SCANS Competencies and Foundation Skills*, was also commissioned to go beyond the identification of the skill definitions and to address the following questions:

- What are the levels of performance for each SCANS skill area defined?
- What features do the SCANS and Occupational Information Network (O*NET) frameworks have in common?
- What assessment tools are available to measure the SCANS skill areas?
- How are exemplary programs providing training for these skills?

As shown in Figure 1, the SCANS framework is divided into workplace competencies and foundation skills. There are five workplace competency areas: managing resources, accessing and storing information, interpersonal situations, understanding systems, and using technology. The foundation skills are a set of basic skills, thinking skills, and personal qualities necessary for proficient performance in each of the competency areas.

Each competency and skill area is described in its own section. Each section contains the elements listed below. Following this list of elements is an explanation of what the elements include and, as appropriate, how they were derived or developed.

- Original SCANS Definition
- Panel Comments
- Summary of Literature Review
- List of Sources
- SCANS Scales Development
- SCANS–O*NET Crosswalks
- Crosswalk to O*NET Scale Anchors
- Other O*NET Links
- Assessments

Original SCANS Definitions. SCANS continues to be a widely recognized framework. As a comprehensive list of necessary skills, its content provides well-conceived definitions of workplace competencies and foundation skills. Each skill section leads with the original SCANS definition as it was published in 1991.

Panel Comments. A technical expert panel was convened to conduct a systematic review of information that was gathered from a review of literature pertaining to the skills that are necessary in the workplace. The panel consisted of business, government, and education professionals with relevant backgrounds in workforce development. Individuals were chosen because they have backgrounds in Academics/Research; National and State Policy; State and Local Programs; Industrial and Organizational Psychology; and Business/Human Resources.

The panelists' comments provide support for the original SCANS definitions, which were also augmented by insights from the other sources. The panelists' comments for each skill area are summarized under this heading.

Summary of the Literature Review. A review was conducted of more than fifty domestic and international sources that, like SCANS, reported on sets of essential skills. The review focused on sources that were current up through 1998 and that defined necessary skills across occupations and industry categories. Direct comparisons between the skills were made by grouping them according to the SCANS framework. While most of the sources complement the SCANS definitions, the review noted additional skills that augment them, where appropriate.

List of Sources. For the list of sources, literature that was published mainly in the last decade is included. Summaries of how a given skill or skill area was defined by a source are included under this heading. While the list of sources is substantive, it should not be seen as exhaustive. Nor is the summary of each definition intended to represent the full interpretation of the source, though every effort was made to be inclusive and accurate.

The list of sources is an excellent resource for future researchers who may work to organize and define workplace skills. A more complete summary of each source is provided in Appendix A.

SCANS Scales Development. Based on the literature review and the panel comments, hierarchical behavioral scales for each skill area were developed to further operationalize the SCANS definitions. Based on the work of the first panel meeting, a draft of the scales for each competency and skill area was prepared. Each scale was based on previous work, conducted either by the DOL, by ACT, or by sources examined in the literature review. In each case, a presumed hierarchy of skill levels was conceived, with each level subsuming the previous one. Group discussions were held regularly by ACT staff to refine these scales and to verify their intent and meaning by checking them against the sources on which the level descriptions were based. These scales then became the subject of a second panel meeting.

In addition to the original panel members, individuals from youth training programs were invited to participate in the second meeting, to offer their input regarding language complexity and the appropriateness of the levels for each scale.

The discussions with the second expert panel yielded a finalized five-point scale for each of the SCANS competencies and foundation skills. However, as justified by the content and supported by the panel, four-point scales were developed for the five Personal Qualities skill areas.

The scales describe a logical progression of skill performance in each skill area, and each level describes the performance of critical tasks. The hierarchical scales operationalize the skill definitions by providing behavioral examples of the skill performance within a skill area. For instance, for the foundation skill, Reading, Level 1 is defined as "Reads simple material such as basic instructions, directories, product labels, menus, phone messages, and signs to be informed or to learn". Level 5 Reading is defined as "Synthesizes specialized or highly technical documents in order to solve problems or perform analysis or evaluation". The rationale for developing the scale is provided to enhance interpretation, and the content of the scale descriptions is provided to make it easier to distinguish one level from the others. Level descriptions are not meant to include all tasks at a particular level. Because the differences between the levels are not necessarily clear-cut, the scales should be used as an interpretive guide only.

These scales are resources that aid the consideration and review of workplace skills. For example, the scales can be used for identifying tasks performed by workers in a given job and when job descriptions and/or training curriculum are in development. The content validity of the scales is supported by the procedures implemented for their development and review, which utilized a panel of technical experts who represented the interests of professionals in education and training, business and industry, and government. The scales have not yet been validated in the workplace. They should ***not***, therefore, be used in any high-stakes decision-making circumstance such as hiring, evaluation, or termination; or in any workplace situation where employees are differentiated as a result of their perceived performance with respect to these scales. Further research is needed before the scales can be applied to any particular job or occupation, or to any individual worker's level of performance for decision-making purposes.

*SCANS - O*NET Crosswalks.* The Occupational Information Network (O*NET) is replacing the *Dictionary of Occupational Titles*. The content model of O*NET (Figure 2) is designed to provide a systematic way to collect and analyze occupational information in order to accurately describe the activities, context, characteristics, and requirements of each occupation in the United States.

Figure 2: O*NET Content Model

Worker Requirements Basic Skills Cross Functional Skills Knowledges Education	**Occupational Requirements** Generalized Work Activities Work Context Organizational Context
Worker Characteristics Abilities Occupational Values & Interests Work Styles	**Occupation-Specific Requirements** Occupational Knowledges Occupational Skills Tasks Duties Machines, Tools, and Equipment
Experience Requirements Training Experience Licensure	**Occupation Characteristics** Labor Market Information Occupational Outlook Wages

Because of O*NET's importance in describing occupational skills, this report provides a crosswalk from SCANS to O*NET. This crosswalk permits understanding of the O*NET skill definitions and scales as they compare to the SCANS skill definitions and scales, and vice versa. At the broadest level, the framework level, the SCANS competencies and foundation skills are similar to the cross-functional and basic skills described in O*NET's Worker Requirements. For the purpose of this crosswalk, each of the SCANS definitions was considered as a unit and was matched to an O*NET Worker Requirement skill definition that covers, or implies coverage, of the whole SCANS skill definition.

BEST COPY AVAILABLE

The Worker Requirement skill definitions were targeted because they are the most clearly defined and fully developed of the O*NET definitions. In many cases, there is a strong match between a SCANS definition of a skill and the O*NET perceived equivalent. However, because of the approach taken, there are many instances where only a partial match exists. For example, the O*NET definition may be too narrow and may exclude skills covered in SCANS. Or, the organization of the framework may interfere with a direct one-to-one match (e.g., SCANS describes the competency of *Problem Solving* in one definition, whereas O*NET has the category *Complex Problem Solving Skills* that contains definitions for eight individual competencies.)

SCANS is widely used in education and training situations. O*NET is becoming increasingly important in the development and evaluation of training programs, job analysis and job design, and career development planning. It is important that a common language be established to facilitate the use of both frameworks and the understanding of the relationships between them. The crosswalk is a resource for those who have adopted SCANS or similar frameworks and need guidance for their transition to the new O*NET framework. The Crosswalks are not intended to replace SCANS or imply equivalence, but to direct users to definitions of similar skill areas.

Appendix B contains a table of the SCANS - O*NET Crosswalk, and an O*NET-SCANS Crosswalk. The latter crosswalk considers the O*NET definitions as a whole and matches a SCANS definition that covers, or implies coverage of, the whole skill definition. The direction of the crosswalk affects the interpretation, and the differences, though subtle, are meaningful.

*SCANS-O*NET Scale Anchors and How They Relate to Each Other.* Where the SCANS-O*NET Crosswalk indicates a strong match of definitions, a crosswalk is provided at the scale level. Each O*NET skill area contains three scale anchors: High, Medium, and Low. Where a match exists at the definition level, the SCANS scale level definitions were matched to the O*NET scale anchors. It is important to note that Level 5 on the SCANS scales does not always correspond to the "High" O*NET scale anchor. And Level 1 on the SCANS scales is not always equal to the "Low" O*NET scale anchor. Appendix B contains a table of the Crosswalk to O*NET Scale Anchors.

*Other O*NET Links.* Because O*NET is a comprehensive framework of skills, references to skills and skill areas use different language throughout the framework (i.e., Worker Characteristics and Occupational Requirements). The O*NET categories describe potentially different aspects of workplace skills that are relevant to the SCANS skill areas. Therefore, other possible O*NET links are provided under this heading. As with the crosswalks, the links are a resource to help navigate the O*NET framework and locate definitions of similar skills.

Assessments. To identify workplace-related assessments for this section, resources such as *Tests in Print*, the *Mental Measurements Yearbooks*, and the *ERIC/AE Test Locator* were consulted. This literature review produced a list of potential assessments that were designed for youth or young adult populations, were suitable for nationwide administration, and appeared to be relevant to the SCANS competencies and foundation skills. After this list of assessments was generated, major assessment publishers were identified.

Test publishers were asked to provide test descriptions and technical information. In cases where a company did not respond, or where additional information was needed, published assessment resources or the company's Internet site were consulted. Every effort was made to gather a comprehensive list of assessments, but the possibility remains that some eluded the search.

No attempt to review or critique the assessments listed in this report was made by ACT or the Department of Labor. The test publisher or a testing publication provided the assessment information and the determination as to which skills are measured. The assessment information in this report should be reviewed carefully and further information should be obtained from the publisher prior to any purchasing decisions. Appendix C contains the full list of assessments in alphabetical order with the following information:

- Publisher and availability information
- Potential links to SCANS skills
- Purpose of the assessment
- Assessment description
- Suitable population
- Assessment format
- Scoring methodology
- Technical information

Case Studies: Effective Strategies for Teaching Workplace Essential Skills

The case study report, found in Appendix D, documents effective instructional practices for helping learners[1] develop and improve essential workplace skills. It documents the workplace skills that are critical to the production of a quality workforce, the level of competency at which workers need to perform these skills, and the assessment tools that are available to measure them.

Based on its expertise in school-to-career and workforce development programs, Jobs for the Future was commissioned to conduct case studies of six diverse programs to identify effective teaching and training strategies that are being used in educational and workforce development programs. The sites were selected to represent diversity of program types, geographic location, instructional approaches and strategies, and populations served.

Appendix D describes lessons provided by professionals in the education and workforce development field, about how exemplary programs are providing skill training for workplace essential skills, and about the principles of effective practices that these diverse case study sites have in common. Since the goal is to implement effective practices on a scale that benefits large numbers of people, the case studies document systems and structures that support sustainable implementation of effective instructional practices, illustrating both the effective instructional practices and the experience of using them on a large scale. The study is based on four key questions:

1. What are exemplary teaching and learning strategies for developing essential workplace skills?
2. What are the principles and characteristics of high quality practices that make them effective?

---

[1] The term "learners" is used to describe a wide range of program participants who are engaged in developing workplace essential skills. These include high school students; alternative high school students; out-of-school youth and adults seeking high school completion, GED certificates, Adult Basic Education, or English as a Second Language programs; court-referred youth, community college students; and adults who want to start their own business. They share a common desire and commitment to learn workplace skills that will open the door to economic opportunities.

3. What teaching and training strategies are effective for different types of education and training programs serving different populations?
4. What systems and structures make it possible to implement effective practices on a significant scale and sustain progress over time?

Each case study involved a two-day site visit, phone interviews, and a review of relevant documents. The sites studied include:

- The Boston Private Industry Council: Boston, Massachusetts
- Horizonte Instructional and Technical Center: Salt Lake City, Utah
- Long Beach City College: Long Beach, California
- North Clackamas School District: North Clackamas, Oregon
- REAL Enterprises: Durham, North Carolina
- YouthBuild Rockford: Rockford, Illinois

Despite substantial differences in the programs, they shared underlying consistencies that provide lessons about key principles of effective practices for helping diverse populations learn workplace essential skills, and systems and structures that make it possible to sustain effective instructional practices, while increasing the number of learners, over time.

WORKPLACE COMPETENCIES: Resources

Allocates Time

SCANS Definition:

Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules.

Demonstrating competence includes properly identifying tasks to be completed; ranking them in order of importance; developing and following an effective, workable schedule based on accurate estimates of such things as importance of tasks, time to complete tasks, time available for completion, and task deadline; avoiding wasting time; and accurately evaluating and adjusting a schedule.

Panel Comments:

The activity of planning should be included in each of the "allocates" categories.

The negative statement "avoiding wasting time" doesn't fit with other competencies. It would be better if stated positively (e.g., "uses time effectively or efficiently").

Summary of Literature Review:

Seven sources, listed below, were found to include some aspect of the competency "allocates time" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for allocating time. However, most of the sources were not divided into separate categories for time, money, materials, and human resources. The sources indicate that the ability to allocate is more important than what is being allocated.

List of Sources:

Chatham-Savannah Compact	Resources: Demonstrates the ability to prioritize tasks, demonstrates the ability to schedule/order events, allocates time, and calculates with units of time (e.g., figuring, shipping, scheduling, time zones).
Consensus Framework for Workplace Readiness	Thinking/problem solving skills: Allocates necessary resources.
Equipped for the Future	Common activities: Find, manages, shares and allocates time, money, and material resources. Use resources in a way that supports own needs, goals, and priorities and those of the family, organization, or community. Also, identify and secure the resources needed and make sure they are used wisely.
High Schools and the Changing Workplace: The Employer's View	Computation: Determine the costs, time, or resources necessary for a task.

Kansas Competency Index of Workplace Skills

Managing resources: Manages time (establishes goals, identifies time wasters, evaluates use of time, sets priorities, and develops a time plan).

Mexico's Occupational Analysis Study

Coordination and administration of activities: [Level 5] Evaluates personnel, project, operations and programs; design programs; establish program goals and determine activities to meet goals; recommend and carry out solutions to problems as necessary. [Level 4] Coordinate activities, operations and personnel; administer resources; identify priorities and supervise activities. [Level 3] Schedule, plan, and organize activities; make estimates of resources needed for an operation or activity; explain procedures to others to carry out duties. [Level 2] Make phone calls or prepare correspondence to arrange appointments or meeting; guide activities of the public or co-workers; arrange for permits and authorizations; schedule own activities. [Level 1] Provide direct support for activities; prepare the work area or arranging for necessary materials for an activity.

SCANS Scales:

	Level 5	Coordinates timing of activities across projects and/or processes. Adjusts multiple schedules for organizational effectiveness and/or profitability.
SCANS Scale Rationale:	Level 4	Establishes deadlines and task schedules for a project or process involving multiple tasks and work units. Evaluates and adjusts schedules as necessary.
Proactive toward complex tasks ↑	Level 3	Establishes deadlines and task schedules for others within own work unit for group effectiveness and/or profitability. Determines sequence and importance of work unit's tasks.
Reactive toward simple tasks	Level 2	Determines sequence and importance of own tasks. Adjusts order and length of tasks as needed to meet deadlines and produce desired outcomes. Looks ahead in order to adjust time given to specific tasks, adjusting speed as necessary.
	Level 1	Performs own tasks in a specified order within time limits. Uses time efficiently to improve performance.

SCANS—O*NET Crosswalk:

O*NET Time Management (Technical Definition): Can manage own and other people's time, prioritizing, judging level of effort, identifying critical periods and allocating other people's time to key tasks. (Operational Definition) Managing one's own time and the time of others.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Scale Rationale:

Proactive toward complex tasks
↑
Reactive toward simple tasks

SCANS Allocates Time			O*NET Time Management	
Level 5	Coordinates timing of activities across projects and/or processes. Adjusts multiple schedules for organizational effectiveness and/or profitability.	➨	High	Allocating the time of scientists to multiple research projects.
Level 4	Establishes deadlines and task schedules for a project or process involving multiple tasks and work units. Evaluates and adjusts schedules as necessary.			
Level 3	Establishes deadlines and task schedules for others within own work unit for group effectiveness and/or profitability. Determines sequence and importance of work unit's tasks.	➨	Medium	Allocating the time of subordinates to projects for the coming week.
Level 2	Determines sequence and importance of own tasks. Adjusts order and length of tasks as needed to meet deadlines and produce desired outcomes. Looks ahead in order to adjust time given to specific tasks, adjusting speed as necessary.	➨	Low	Keeping a monthly calendar of appointments.
Level 1	Performs own tasks in a specified order within time limits. Uses time efficiently to improve performance.			

Other O*NET Links: The O*NET framework contains other references to allocating time. These include:

Time Sharing (Worker Characteristics): The ability to efficiently shift back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources).

Scheduling Work Activities (Occupational Requirements): Scheduling events, programs, activities, as well as the work of others.

Estimating the Characteristics of Materials, Products, Events, or Information (Occupational Requirements): Estimating the sizes, distances, and quantities, or determining time, costs, resources, or materials needed to perform a work activity.

Assessments:

Flanagan Industrial Tests (FIT)	NCS Workforce Development Division 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	**Allocates time** Reading Arithmetic/Mathematics Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Allocates time** Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Allocates time** Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	**Allocates time** Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Resources

Allocates Money

SCANS Definition:

Prepares budgets, makes cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments.

Demonstrating competence includes accurately preparing and using a budget consistent with accounting methods, accurately calculating future budgetary needs based on projected costs and revenues, accurately tracking the extent to which actual costs and revenues differ from the estimated budget, and taking appropriate and effective actions.

Panel Comments:

In constructing a scale, the lowest level would include "making change."

Summary of Literature Review:

Seven sources, listed below, were found to include some aspect of the competency "allocates money" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for allocating money. However, as noted with "allocating time," most of the sources were not divided into separate resource categories, indicating that the ability to allocate is more important than what is being allocated.

List of Sources:

Chatham-Savannah Compact	Money: Interprets and uses financial forms (e.g., money orders, paychecks); interprets and processes bills, business invoices, and utility bills.
Consensus Framework for Workplace Readiness	Thinking/problem solving skills: Allocates necessary resources.
Equipped for the Future	Common activities: Find, manages, shares and allocates time, money, and material resources. Use resources in a way that supports own needs, goals, and priorities and those of the family, organization, or community. Also, identify and secure the resources needed and make sure they are used wisely.
High Schools and the Changing Workplace: The Employer's View	Computation: Determine the costs, time, or resources necessary for a task.

Kansas Competency Index of Workplace Skills

Managing resources: Manages money (makes change for a cash transaction, prepares a budget, develops a pricing policy).

Mexico's Occupational Analysis Study

Coordination and administration of activities: [Level 5] Evaluates personnel, project, operations and programs; design programs; establish program goals and determine activities to meet goals; recommend and carry out solutions to problems as necessary. [Level 4] Coordinate activities, operations and personnel; administer resources; identify priorities and supervise activities. [Level 3] Schedule, plan, and organize activities; make estimates of resources needed for an operation or activity; explain procedures to others to carry out duties. [Level 2] Make phone calls or prepare correspondence to arrange appointments or meeting; guide activities of the public or co-workers; arrange for permits and authorizations; schedule own activities. [Level 1] Provide direct support for activities; prepare the work area or arranging for necessary materials for an activity.

SCANS Scales:

SCANS Scale Rationale:

Proactive toward tasks
↑
Reactive toward tasks

Level 5	Develops and governs a financial plan for an organization, including projecting organizational revenue verses costs over time, distributing funding to departmental or project budgets, allocating revenue to financial investments for projected purposes, and evaluating financial risks of new products or business ventures.
Level 4	Makes cost and revenue projections for several multiple-task projects, and develops budgets within those parameters. Evaluates and adjusts budgets as necessary based on revised cost and revenue projections.
Level 3	Makes cost and revenue projections for a single multiple-task project, and develops a budget within those parameters. Evaluates and adjusts budget as necessary based on revised cost and revenue projections.
Level 2	Tracks expenditures relative to a budget; makes adjustments as necessary and/or informs superiors of potential problems. Within a specified allocation, estimates costs for specific activities. Adjusts priorities based on evaluation of costs within a specified budget.
Level 1	Performs and records a cash transaction, including determining the amount of the transaction, receiving payment from a client/customer or obtaining funds from an account, making or receiving the correct change, and recording the transaction either by using a cash register or filing a receipt according to procedures.

SCANS—O*NET Crosswalk:

Management of financial resources: (Technical Definition) Obtains monetary or budget support for various projects; allocating funds to these projects and accounting for expenditures. (Operational Definition) Determining how money will be spent to get the work done and accounting for these expenditures.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Scale Rationale:

Proactive toward tasks

↑

Reactive toward tasks

SCANS Allocates Money			*O*NET Management of Financial Resources*	
Level 5	Develops and governs a financial plan for an organization, including projecting organizational revenue verses costs over time, distributing funding to departmental or project budgets, allocating revenue to financial investments for projected purposes, and evaluating financial risks of new products or business ventures.	➨	High	Developing and approving yearly budgets for a large corporation and obtaining financing as necessary.
Level 4	Makes cost and revenue projections for several multiple-task projects, and develops budgets within those parameters. Evaluates and adjusts budgets as necessary based on revised cost and revenue projections.			
Level 3	Makes cost and revenue projections for a single multiple-task project, and develops a budget within those parameters. Evaluates and adjusts budget as necessary based on revised cost and revenue projections.	➨	Medium	Preparing and managing a budget for a short-term project.
Level 2	Tracks expenditures relative to a budget; makes adjustments as necessary and/or informs superiors of potential problems. Within a specified allocation, estimates costs for specific activities. Adjusts priorities based on evaluation of costs within a specified budget.			

Level 1	Performs and records a cash transaction, including determining the amount of the transaction, receiving payment from a client/customer or obtaining funds from an account, making or receiving the correct change, and recording the transaction either by using a cash register or filing a receipt according to procedures.	➡	Low	Taking money from petty cash to buy office supplies and recording the amount of the expenditure.

Other O*NET Links: The O*NET framework contains other references to allocating money. These include:

Estimating the characteristics of materials, products, events, or information (Occupational Requirements): Estimating the sizes, distances, and quantities, or determining time, costs, resources, or materials needed to perform a work activity.

Monitoring and controlling resources (Occupational Requirements): Monitoring and controlling resources and overseeing the spending of money.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Allocates time** **Allocates money** Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time **Allocates money** Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking
TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time **Allocates money** Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Resources

Allocates Materials and Facility Resources

SCANS Definition:	Acquires, stores, and distributes materials, supplies, parts, and equipment, space, or final products to make the best use of them. Demonstrating competence includes carefully planning the steps involved in the acquisition, storage, and distribution of resources; safely and efficiently acquiring, transporting, or storing them; maintaining them in good condition; and distributing them to the end user.
Panel Comments:	The same scale, abstractly, as time should be use for this skill. In constructing the scale, the highest level would involve estimation (e.g., general contractor). The descriptions of the scale level should also include contextual terms when appropriate.
Summary of Literature Review:	Six sources, listed below, were found to include some aspect of the competency "allocates materials and facility resources" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for allocating materials and facility resources. However, as noted with "allocating time" and "allocating money," most of the sources were not divided into separate resource categories, indicating that the ability to allocate is more important than what is being allocated.
List of Sources:	
Consensus Framework for Workplace Readiness	Thinking/problem solving skills: Allocates necessary resources.
Equipped for the Future	Common activities: Find, manages, shares and allocates time, money, and material resources. Use resources in a way that supports own needs, goals, and priorities and those of the family, organization, or community. Also, identify and secure the resources needed and make sure they are used wisely.
High Schools and the Changing Workplace: The Employer's View	Computation: Determine the costs, time, or resources necessary for a task.

Kansas Competency Index of Workplace Skills	Managing resources: Manages facilities (complies with safety and health rules, organizes work space) and materials (requisitions supplies/equipment, identifies purchasing sources, explains concepts of supply and demand).
Mexico's Occupational Analysis Study	Handling, storing, conservation, and manufacturing of materials and products: [Level 5] Evaluates existing systems and processes in order to develop new or improved processes and/or products. [Level 4] Diagnoses problems concerning processes and the installation of equipment to manufacture products and suggest solutions. [Level 3] Manufacture, install, repair, and safeguard materials, products, installations, or equipment, as well as carry out tests on products' characteristics and conditions. [Level 2] Follow specifications or instructions when channeling materials, products, equipment or machinery. [Level 1] Follow procedures or instructions in order to undertake a specific task, including physical activities such as classification, cleaning, loading, stacking, mixing, storing, and delivering materials and products. Coordination and administration of activities: [Level 5] Evaluates personnel, project, operations and programs; design programs; establish program goals and determine activities to meet goals; recommend and carry out solutions to problems as necessary. [Level 4] Coordinate activities, operations and personnel; administer resources; identify priorities and supervise activities. [Level 3] Schedule, plan, and organize activities; make estimates of resources needed for an operation or activity; explain procedures to others to carry out duties. [Level 2] Make phone calls or prepare correspondence to arrange appointments or meeting; guide activities of the public or co-workers; arrange for permits and authorizations; schedule own activities. [Level 1] Provide direct support for activities; prepare the work area or arranging for necessary materials for an activity.
Skill Demand, Changing Work Organization, and Performance	Workplace competencies: Is able to allocate space and materials.

SCANS Scales:

SCANS Scale Rationale:

Proactive toward tasks
↑
Reactive toward tasks

Level 5	Defines business processes or financial rules for the allocation of materials. Designs complex workstations involving multiple systems. Evaluates specifications of new equipment or materials for compatibility or integration into existing environment.
Level 4	Coordinates the acquisition and use of materials or facilities across multiple projects, assuring that proper storage and maintenance are available. Monitors the use of materials and facilities to ensure that they are being used efficiently and that project demands are being met. Distributes materials and facilities across projects.
Level 3	Determines the materials or facilities needed for a multiple-task project. Identifies the sources and costs of materials or facilities. Designs storage plans and distribution methods for materials, and coordinates their use within projects.
Level 2	Determines the type and quantity of materials or facilities needed to complete a work task. Follows a distribution plan. Obtains facility resources according to a work plan. Stores and maintains per specifications.
Level 1	Obtains, stores, and/or delivers specific materials as specified in a work plan.

SCANS—O*NET Crosswalk:

Management of material resources: (Technical Definition) Obtains and allocates equipment, facilities, and materials needed to do a job ensuring its maintenance and overseeing its use. (Operational Definition) Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Allocates Materials and Facility Resources			O*NET Management of Material Resources	
Level 5	Defines business processes or financial rules for the allocation of materials. Designs complex workstations involving multiple systems. Evaluates specifications of new equipment or materials for compatibility or integration into existing environment.	➡	High	Determining the computer system needs of a large corporation and monitoring use of the equipment.
Level 4	Coordinates the acquisition and use of materials or facilities across multiple projects, assuring that proper storage and maintenance are available. Monitors the use of materials and facilities to ensure that they are being used efficiently and that project demands are being met. Distributes materials and facilities across projects.	➡	Medium	Evaluating an annual uniform service contract for delivery drivers.
Level 3	Determines the materials or facilities needed for a multiple-task project. Identifies the sources and costs of materials or facilities. Designs storage plans and distribution methods for materials, and coordinates their use within projects.			
Level 2	Determines the type and quantity of materials or facilities needed to complete a work task. Follows a distribution plan. Obtains facility resources according to a work plan. Stores and maintains per specifications.	➡	Low	Renting a meeting room for a management meeting.
Level 1	Obtains, stores, and/or delivers specific materials as specified in a work plan.			

SCANS Scale Rationale:

Proactive toward tasks
↑
Reactive toward tasks

Other O*NET Links: The O*NET framework contains other references to allocating materials and facility resources. These include:

Product inspection (Worker Requirements): Inspects and evaluates the products of a process or procedure to make sure they are meeting design specifications, error tolerances, and user needs.

Estimating the characteristics of materials, products, events, or information (Occupational Requirements): Estimating the sizes, distances, and quantities, or determining time, costs, resources, or materials needed to perform a work activity.

Monitoring and controlling resources (Occupational Requirements): Monitoring and controlling resources and overseeing the spending of money.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money **Allocates material and facility resources** Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money **Allocates material and facility resources** Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money **Allocates material and facility resources** Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Resources

Allocates Human Resources

SCANS Definition:

Assesses knowledge and skills and distributes work accordingly, evaluates performance, and provides feedback.

Demonstrating competence includes accurately assessing an individual's knowledge, skills, abilities, and potential; identifying present and future workloads; making effective matches between individual talents and workload; and actively monitoring performance and supplying feedback.

Panel Comments:

None.

Summary of Literature Review:

Five sources, listed below, were found to include some aspect of the competency "allocates human resources" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for allocating human resources. However, as noted with "allocating time," "allocating money," and "allocating materials and facility resources," most of the sources were not divided into separate resource categories, indicating that the ability to allocate is more important than what is being allocated.

List of Sources:

Chatham-Savannah Compact	Human resources: Explain ideas from a work plan and options for implementation; demonstrates the ability to evaluate results, and identifies work-related problems and potential solutions.
Consensus Framework for Workplace Readiness	Thinking/problem solving skills: Allocates necessary resources.
Kansas Competency Index of Workplace Skills	Managing resources: Manages human resources (develops a job description, prepares an organization chart).

Mexico's Occupational Analysis Study

Coordination and administration of activities: [Level 5] Evaluates personnel, project, operations and programs; design programs; establish program goals and determine activities to meet goals; recommend and carry out solutions to problems as necessary. [Level 4] Coordinate activities, operations and personnel; administer resources; identify priorities and supervise activities. [Level 3] Schedule, plan, and organize activities; make estimates of resources needed for an operation or activity; explain procedures to others to carry out duties. [Level 2] Make phone calls or prepare correspondence to arrange appointments or meeting; guide activities of the public or co-workers; arrange for permits and authorizations; schedule own activities. [Level 1] Provide direct support for activities; prepare the work area or arranging for necessary materials for an activity.

Skill Demand, Changing Work Organization, and Performance

Workplace competencies: Allocates staff.

SCANS Scales:

SCANS Scale Rationale:

Greater degree of judgement
↑
Lesser degree of judgement

Level 5	Determines individuals' potential for learning and accomplishing unfamiliar tasks and activities. Makes hiring decisions based on estimates of applicants' potential to meet job demands. Assigns individuals to training programs based on estimated potential and learning needs.
Level 4	Determines individuals' ability to perform a variety of complex tasks. Assigns people to work on multiple-task projects that require minimal supervision. Provides feedback to individuals regarding their performance in managing projects.
Level 3	Determines individuals' ability to perform specific tasks by observing them perform the tasks or similar tasks. Identifies areas of deficiency to recommend further development and training.
Level 2	Assigns or reassigns people to tasks based upon their known skills and abilities. Provides feedback to individuals regarding their performance on tasks.
Level 1	Assigns individuals from a pool of qualified workers to single tasks based upon their availability. Assigns oneself to tasks based on self-assessment of skills, task, and workload.

SCANS—O*NET Crosswalk:

Comments: No equivalent. There is an association to O*NET's *Management of Personnel Resources*, but the definition does not directly correspond. SCANS emphasizes the distribution of personnel, while O*NET emphasizes management of personnel.

Other O*NET Links:

The O*NET framework contains other references to allocating human resources. These include:

Management of personnel resources (Worker Requirements): Recruits people with appropriate expertise and assigns them to relevant tasks, monitoring, developing, and motivating them as they work on these tasks.

Estimating the characteristics of materials, products, events, or information (Occupational Requirements): Estimating the sizes, distances, and quantities, or determining time, costs, resources, or materials needed to perform a work activity.

Monitoring and controlling resources (Occupational Requirements): Monitoring and controlling resources and overseeing the spending of money.

Staffing organizational units (Occupational Requirements): Recruiting, interviewing, selecting, hiring, and promoting persons in the organization.

Assessments:

Industrial Psychology International, Ltd. -- Judgement

Industrial Psychology International, Ltd. (IPI)
4106 Fieldstone Road
Champaign, IL 61822
(217)398-1437
(800)747-1119

Allocates time
Allocates money
Allocates material and facility resources
Allocates human resources
Acquires and evaluates information
Organizes and maintains information
Interprets and communicates information
Uses computers to process information
Teaches others
Exercises leadership
Negotiates to arrive at a decision
Understands systems
Monitors and corrects performance
Improves and designs systems
Selects technology
Applies technology to task
Creative thinking
Problem solving
Seeing things in the mind's eye
Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources **Allocates human resources** Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking
Industrial Psychology International, Ltd. -- Verbal Proficiency Assessment (VPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Allocates human resources** Interprets and communicates information Participates as a team member Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Understands systems Speaking

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources **Allocates human resources** Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Information

Acquires and Evaluates Information

SCANS Definition:

Identifies need for data, obtains them from existing sources or creates them, and evaluates their relevance and accuracy.

Demonstrating competence includes posing analytic questions to determine specific need for information, selecting possible information and evaluating its appropriateness, and determining a need for new information.

Panel Comments:

None.

Summary of Literature Review:

Twenty-one sources, listed below, were found to include some aspect of the competency "acquires and evaluates information" as part of their definition of necessary workplace skills. In general, the sources support the SCANS definition for acquiring and evaluating information. However, many sources also include the behaviors of locating, interpreting, converting, utilizing, and analyzing information in all formats and from all media. They also emphasize the importance of performing this skill efficiently and evaluating the sources of the information as well as the information itself.

List of Sources:

Arizona Workplace Skills Standards (Draft)

Use principles of effective oral, written and listening communication skills to make decisions and solve workplace problems, which includes identifying the relevant details and facts of written material; and responding to oral and written presentations by formulating relevant feedback, express, opinions, discern the main idea, and distinguish fact from opinion.

Apply critical and creative thinking skills to make decisions and solve workplace problems, which includes utilizing information acquired form several sources and transfer information learned in one situation to another.

Identifying need for data, obtaining it, and developing a validation instrument for determining its accuracy.

Australia's Key Competencies

Collecting, analyzing and organizing information: Locates information, evaluates both the information itself and the sources and methods used to obtain it.

Basic Skill Requirements for Selected Army Occupational Training Courses	Locating information: Being able to alphabetize, using alphabetical or numerical system to locate information, using a table of contents, using one reference to locate another reference, and using a legend or key. Understanding graphics: Reading and understanding tables, graphs, and charts, reading and understanding schematics and diagrams, and relating text to corresponding graphics. Asking questions: Reading for and understanding details, asking appropriate questions, and asking a series of questions to gain detailed information.
California Career-Technical Assessment Project (CTAP)	Thinking and problem-solving skills: Identifies, locates, and organizes information for ease of interpretation.
Chatham-Savannah Compact	Information: Acquires and evaluates information from written work instructions, work orders, labels, safety warnings, product instructions, procedures manuals, directions in textbooks, manuals, handouts, road/street signs/symbols, maps, tests, logs, journals, telephone books, dictionaries, schedules, job announcements, advertisements, computer printouts, classified advertisements, insurance forms, warranties, contracts, agreements, tax forms, legal notices, and written specifications (e.g., plans and blueprints).
Consensus Framework for Workplace Readiness	Communication: Receives, processes, and conveys information using a variety of sources (such as written, verbal, non-verbal, and symbolic; technological and multi-media; abstract as well as concrete) to gather information efficiently.
Equipped for the Future	Gather, analyze and use information: Find and analyze information from diverse sources. Research: Seek out information from multiple sources.
Getting a Job after College	Functional skills: Demonstrates research skills.
Kansas Competency Index of Workplace Skills	Basic language arts skills: Reads, understands, and finds information in books, manuals, directories, etc.; reads and understands forms; uses a dictionary; and interprets workplace documents such as policy manuals, order forms, etc.
Kentucky Council on School Performance Standards	Information-processing skills: Uses the features of books and other reference materials; uses standard library reference skills to locate and retrieve information.

Mexico's Occupational Analysis Study	Administration of information: [Level 5] Judge the quality, pertinence, importance, and authenticity of information from multiple sources to reach conclusions and recommendations to be taken. [Level 4] Understand information as a whole, identify implications, tendencies and patterns in information through reading or by means of computers or other technology. [Level 3] Locate, collect, process, and protect information and the creation of systems for safeguarding. [Level 2] Record, input, format, verify, store, and upkeep information. [Level 1] File and locate information using simple and direct methods such as alphabetical and numerical codes. Reading materials for information: [Level 5] Read complex documents and compositions to analyze, evaluate, and solve problems and make decisions. [Level 4] Read complex, routine documents to coordinate work activities, to inform others and make decisions. [Level 3] Read various materials to obtain information to determine work to be carried out or how to repair machinery or equipment, interpret graphs, tables, and written instructions or directions. [Level 2] Read work orders, instructions, memorandums, etc. to carry out activities correctly. [Level 1] Read very simple materials to carry out activities correctly. Locating information: [Level 5] Make use of complex and extensive documents such as forms, maps and diagrams, handle different types of documents that contain less common terminology, symbols, and formats, clarify complicated data and interpret for specific ends or to apply data to a new situation. [Level 4] Carry out a careful study for the recognition of tendencies, find the main ideas in a collection of data, and discriminate and select relevant information for a specific purpose from a large amount of information and apply it in similar situations. [Level 3] Attend to matters generated by differences within or between documents, seek different items of information, make generalizations, take other sources of information as points of reference so as to confirm and clarify information, and consider the document's framework when making comparisons. [Level 2] Use documents such as order forms, charts, tables, plans, and simple diagrams, locate information in the proper place, understand basic terminology used in the work place, and find addresses on a map and interpret location of objects on a plan. [Level 1] Handle simple documents which contain one or two items of information, follow a recording or filing method, use information such as titles and authors' names to locate information rapidly, recognize symbols, colors, or patterns to locate information, and identify common forms of data.
Michigan Employability Skills	Academic skills: Uses research and library skills.
New Standards Project	Collecting, analyzing and organizing information: Defines the needs of audiences and the purposes of the information; and critically investigates sources to identify and distil relevant information; and identifies within information the main organizing categories and structures; and evaluates the quality and validity of information.
New Zealand's Essential Skills	Information Skills.
PLATO Learning System	Reading for information and data skills.

Skill Demand, Changing Work Organization, and Performance	Workplace competencies: Acquires and evaluates data.
Texas Workplace Skills Inventory	Among skills identified as essential: Asks questions when appropriate.
Washington Basic Skills	Looking up and obtaining information: Alphabetizes, uses a dictionary, reads abbreviations, classified advertisements, job advertisements, dictionaries, telephone books, work-related schedules, policy manuals, job announcements, and computer printouts.
Washington Workplace Competency Worksheet	Reading: Locates information. Information: Converts information from one form to another to convey information (oral and written) as needed, identifies the appropriate source of information for job opportunities, and understands the use of general work-related vocabulary.
Work Keys	Ability to use one or more related graphics to locate, insert, compare, and summarize information. Ability to make decisions, apply information, and draw conclusions based on information contained in one or more graphics.
Young People's Participation in Post-Compulsory Education and Training	Language and communication: Accesses and uses information.

SCANS Scales:

Level 5	Judges the quality, importance, pertinence, and authenticity of information drawn from diverse sources. Reorganizes existing information to create new sources if necessary sources do not exist.
Level 4	Evaluates information that contains specialized technical terms or has a complex structure and composition (such as information of a legal, scientific, engineering, or academic nature). Identifies tendencies and patterns in data and/or comparing information.
Level 3	Evaluates information from sources such as reports, tabular data, forms, maps, diagrams, and interviews for accuracy, significance, and/or relevance. Identifies and corrects discrepancies and errors.
Level 2	Locates information within existing sources by conducting searches, including internet and library searches. Skims and examines sources to locate specific information.
Level 1	Retrieves information according to a plan from existing sources such as standard business forms, reports, invoices, books, etc.

SCANS Scale Rationale:

Indirect access to information and greater degree of judgement.

↑

Immediate access to information and lesser degree of judgement.

SCANS—O*NET Crosswalk:

Comments: The context of "information" is presented differently in the SCANS frameworks versus the O*NET framework. SCANS constructed skill categories that address specific activities related to using information. O*NET distributed the use of information across many of its skill area definitions. For the SCANS skill of "acquiring information," there is a relationship to O*NET Complex Problem Solving Skill "Information Gathering" and System Skill "System Evaluation."

Other O*NET Links:

The O*NET framework contains other references to acquiring and evaluating information. These include:

Perceptual speed (Worker Characteristics): The ability to quickly and accurately compare letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.

Flexibility of closure (Worker Characteristics): *The ability to identify or detect a known pattern* (a figure, object, word, or sound) that is hidden in other distracting material.

Speed of closure (Worker Characteristics): The ability to quickly make sense of information that seems to be without meaning or organization. It involves quickly combining and organizing different pieces of information into a meaningful pattern.

Information gathering (Worker Requirements): Knowing how to find information and identifying essential information.

Systems evaluation (Worker Requirements): Looking at many indicators of system performance taking into account their accuracy.

Evaluating information for compliance to standards (Occupational Requirements): Evaluating information against a set of standards and verifying that it is correct.

Judging the qualities of objects, services, or persons (Occupational Requirements): Making judgements about or assessing the value, importance, or quality of things or people.

Monitoring processes, materials, or surroundings (Occupational Requirements): Monitoring and reviewing information from materials, events, or the environment, often to detect problems or to find out when things are finished.

Identifying objects, actions, and events (Occupational Requirements): Identifying information received by making estimates or categorizations, recognizing differences or similarities, or sensing changes in circumstances or events.

Getting information needed to do the job (Occupational Requirements): Observing, receiving, and otherwise obtaining information from all relevant sources.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources **Acquires and evaluates information** Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources **Acquires and evaluates information** Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Acquires and evaluates information** Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty
TABE (Test of Adult Basic Education) 7&8 Complete Battery	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	**Acquires and evaluates information** Reading Writing Arithmetic/Mathematics Creative thinking Problem solving Reasoning

TABE (Test of Adult Basic Education) 7&8 Survey	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	**Acquires and evaluates information** Reading Writing Arithmetic/Mathematics Creative thinking Problem solving Reasoning
TABE Work-Related Foundation Skills (TABE-WF)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	**Acquires and evaluates information** Reading Writing Arithmetic/Mathematics Creative thinking Problem solving Reasoning

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources **Acquires and evaluates information** Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning
Watson-Glaser Critical Thinking Appraisal, Forms A and B, (WGCTA), 1980	The Psychology Corporation 555 Academic Court San Antonio, TX 78204 (800)211-8378	**Acquires and evaluates information** Problem solving Reasoning

WORKPLACE COMPETENCIES: Information

Organizes and Maintains Information

SCANS Definition:

Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion.

Demonstrating competence includes understanding and organizing information from computer, visual, oral, and physical sources in readily accessible formats (e.g., computerized databases, spreadsheets, microfiche, videodiscs, paper files); and transforming data into different formats to organize them by the application of sorting, classifying, or more formal methods.

Panel Comments:

None.

Summary of Literature Review:

Ten sources, listed below, were found to include some aspect of the competency "organizes and maintains information" in their definition of necessary workplace skills. In general, these sources support the SCANS definition for organizing and maintaining information. However, several sources also include the behaviors of protecting and extracting information, and there are many references to systems. Therefore, the understanding of systems is related to this skill area. While refining a definition for this skill, it may be helpful to refer to the skill definitions for systems.

List of Sources:

ASTD Update: Basic Skills	Group and organizational effectiveness skills: Exhibits organizational skills.
Chatham-Savannah Compact	Maintains information: Differentiates, sorts, and categorizes information.
Consensus Framework for Workplace Readiness	Communication: Organizes and maintains information.
Getting a Job after College	Functional skills: Demonstrates organization skills.
High School Curriculum Study	Among skills identified by survey results: Keeps records and books.

Kentucky Council on School Performance Standards	Math skills: Organizes data into tables, charts, and graphs. Information processing skills: Uses a computer to access information sources and databases, and extracts and organizes information from data sources.
Mexico's Occupational Analysis Study	Administration of information: [Level 5] Judge the quality, pertinence, importance, and authenticity of information from multiple sources to reach conclusions and recommendations to be taken. [Level 4] Understand information as a whole, identify implications, tendencies and patterns in information through reading or by means of computers or other technology. [Level 3] Locate, collect, process, and protect information and the creation of systems for safeguarding. [Level 2] Record, input, format, verify, store, and upkeep information. [Level 1] File and locate information using simple and direct methods such as alphabetical and numerical codes. Reading materials for information: [Level 5] Read complex documents and compositions to analyze, evaluate, and solve problems and make decisions. [Level 4] Read complex, routine documents to coordinate work activities, to inform others and make decisions. [Level 3] Read various materials to obtain information to determine work to be carried out or how to repair machinery or equipment, interpret graphs, tables, and written instructions or directions. [Level 2] Read work orders, instructions, memorandums, etc. to carry out activities correctly. [Level 1] Read very simple materials to carry out activities correctly.
New York State Education Department	Expanded basics: Uses information systems.
New Zealand's Essential Skills	Information skills.
Washington Workplace Competency Worksheet	Thinking skills: Organizes and applies information correctly. Information: Prepares, maintains, and interprets quantitative and qualitative records.

SCANS Scales:

SCANS Scale Rationale:

Complex operations
↑
Simple operations

Level 5 Aligns information or data to multiple business needs or goals. Links data between similar or dissimilar projects or processes.

Level 4 Transforms data into different formats for the purpose of organizing and storing it. Aligns information or data to business needs or goals.

Level 3 Develops structures for organizing information in computer and physical formats (e.g., for checking accuracy of data, computerized databases, spreadsheets, microfiche, videodiscs, paper files).

Level 2 Classifies and/or categorizes information. Modifies an existing information storage structure to improve its functionality. Identifies which information needs to be secure and which does not.

Level 1 Sorts and organizes information within given categories. Files and locates information using simple and direct methods such as alphabetical and numerical codes. Maintains information so that it is accurate and easy to locate.

SCANS—O*NET Crosswalk:

Comments: The context of "information" is presented differently in the SCANS frameworks versus the O*NET framework. SCANS constructed skill categories that address specific activities related to using information. O*NET distributed the use of information across many of its skill area definitions. For the SCANS skill of "organizing information," there is a relationship to O*NET Complex Problem Solving Skill "Information Organization."

Other O*NET Links:

The O*NET framework contains other references to organizing and maintaining information. These include:

Information ordering (Worker Characteristics): The ability to correctly follow a given rule or set of rules in order to arrange things or actions in a certain order. The things or actions can include numbers, letters, words, pictures, procedures, sentences, and mathematical or logical operations.

Information organization (Worker Requirements): Finding ways to structure or classify multiple pieces of information.

Documenting/recording information (Occupational Requirements): Entering, transcribing, recording, storing, or maintaining information in either written form or by electronic/magnetic recording.

Processing information (Occupational Requirements): Compiling, coding, categorizing, calculating, tabulating, auditing, verifying, or processing information or data.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information **Organizes and maintains information** Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information **Organizes and maintains information** Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking
Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information **Organizes and maintains information** Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information **Organizes and maintains information** Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Information

Interprets and Communicates Information

SCANS Definition:

Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multimedia methods.

Demonstrating competence includes determining the information to be communicated, identifying the best methods to present the information (e.g., overheads, handouts), and converting the information to a desired format when conveying it to others (e.g., oral, written).

Panel Comments:

This competency involves changing the nature of information in order to communicate it.

Summary of Literature Review:

Twelve sources, listed below, were found to include some aspect of the competency "interprets and communicates information" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for interpreting and communicating information. However, many sources include the behaviors of requesting, summarizing, and clarifying information. They also mention defining issues, drawing conclusions, and using a variety of sources. For communicating information, they stress the importance of using diverse methods, as well as determining the best methods. In several sources, there were references to communication skills, so it may be helpful to refer to those summaries while refining this definition.

List of Sources:

AccuVison Workplace Success Skills System	Graphs and charts: Interprets and applies information found in a chart or table format.
Arizona Workplace Skills Standards (Draft)	Apply computation skills and data analysis techniques to make decisions and solve workplace problems, which at the proficiency level includes constructing projections and trends from raw data, charts, tables and graphs that summarize data from workplace situations.
Australia's Key Competencies	Collecting, analyzing, and organizing information: Sifts and sorts information in order to select what is required and present it in a useful way.
California Career-Technical Assessment Project (CTAP)	Communication skills: Understand the principles of effective communication, communicates orally and in writing, listens to others, follows instructions, and requests additional information or clarification as needed.

Chatham-Savannah Compact	Interprets and communicates information: Completes a job application, receives spoken instructions in the workplace, prints/writes legibly in ink, uses appropriate mechanics of standard English, uses job-specific vocabulary appropriately, writes short notes and/or simple memos, writes information in clear, logical, and complete manner, takes telephone messages accurately, communicates via telephone, completes application form, reports emergencies, interviews for specific job opening, writes letters using correct structure and sentence style, completes education/training applications, reads and interprets basic measurement and numerical readings, writes common abbreviations specific to job, completes order forms, places orders, explains products and services, organizes information into a brief written report/executive summary, interprets data from tables, charts, graphs, and asks appropriate questions.
Consensus Framework for Workplace Readiness	Communication: Conveys information using a variety of sources (such as written, verbal, non-verbal, and symbolic; technological, multi-media; abstract as well as concrete) to interpret information and share information.
Equipped for the Future	Common activities: Use information to form opinions, make decisions, and take action. Research: Summarize and organize information for analysis, and evaluate for relevance and use. Communicate findings to others by summarizing, drawing conclusions, and defining issues.
Kentucky Council on School Performance Standards	Math skills: Interprets data. Information processing skills: Summarizes information from data sources.
Mexico's Occupational Analysis Study	Communication: [Level 5] Write and create presentations that inform, persuade or introduce new ideas or make proposals, draft technical reports or other specialized materials, including the translation or materials to other languages with accuracy. [Level 4] Present information on how to carry out work operations, write manuals for a system, draw graphs and tables according to specifications, design programs for use in education and training. [Level 3] Draft instructions on procedures, prepare tables and graphs to show information collected from different sources, use a second language for conveying instructions to others for carrying out an activity. [Level 2] Record events, write basic correspondences memorandums and e-mail messages so as to keep clients, suppliers and co-workers informed. [Level 1] Copying and recording information, such as keeping inventory or preparing a client list.
New Standards Project	Communicating ideas and information: Chooses the mode and form appropriate to a context and audience; and revises and evaluates the communication in light of feedback; and varies style of presentation to suit a variety of contexts; and uses ideas to interpret and represent information in a variety of contexts; and adapts ideas and information to unanticipated responses from audiences.
New Zealand's Essential Skills	Information skills.

Skill Demand, Changing Work Organization, and Performance

Workplace competencies: Interprets and communicates findings from data.

SCANS Scales:

SCANS Scale Rationale:

Complex and incomplete information
↑
Simple and complete information

Level 5	Extrapolates information when it is not immediately obvious or entirely known.
Level 4	Communicates judgments about the quality and uses of data. Communicates data for making decisions. Explains complex information in understandable terms so that it can be received and understood by different audiences.
Level 3	Analyzes information across multiple sources and makes an integrated presentation.
Level 2	Interprets and presents information from multiple sources in oral or written form. Selects the most important issues in each and presents them in a useful way. Selects appropriate format for communicating and displaying information (such as line graphs, bar graphs, tables, pie charts, narrative documents, and/or graphics).
Level 1	Interprets and presents information from one source in oral or written form.

SCANS—O*NET Crosswalk:

Comments: The context of "information" is presented differently in the SCANS frameworks versus the O*NET framework. SCANS constructed skill categories that address specific activities related to using information. O*NET distributed the use of information across many of its skill area definitions.

Other O*NET Links:

The O*NET framework contains other references to interpreting and communicating information. These include:

Synthesis/reorganization (Worker Requirements): Reorganizing information to get a better approach to problems or tasks.

Interpreting the meaning of information for others (Occupational Requirements): Translating or explaining what information means and how it can be understood or used to support responses or feedback to others.

Analyzing data or information (Occupational Requirements): Identifying underlying principles, reasons, or facts by breaking down information or data into separate parts.

Assessments:

Industrial Psychology International, Ltd. -- Fluency	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Interprets and communicates information** Participates as a member of a team Serves clients/customers Negotiates to arrive at a decision Speaking Creative thinking
Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information **Interprets and communicates information** Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information **Interprets and communicates information** Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking
Industrial Psychology International, Ltd. -- Verbal Proficiency Assessment	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates human resources **Interprets and communicates information** Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Understands systems Speaking

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information **Interprets and communicates information** Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information **Interprets and communicates information** Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning
Work Keys Observation	ACT, Inc. P.O. Box 168 Iowa City, Iowa 52243-0168 (800)WORKKEY	**Interprets and communicates information** Listening

WORKPLACE COMPETENCIES: Information

Uses Computers to Process Information

SCANS Definition:

Employs a computer to acquire, organize, analyze, and communicate information.

Demonstrating competence includes entering, modifying, retrieving, storing, and verifying data and other information; choosing a format for displaying information (e.g., line graph, bar graph, tables, pie charts, narrative); and ensuring the accurate conversion of information into a chosen format.

Panel Comments:

The panel recommends this competency be embedded in other SCANS competencies where appropriate. The behaviors of "acquiring, organizing, analyzing, and communicating information" in this competency are covered in the other information competencies, as well as the technology competencies, whether or not a computer is used to perform the tasks. Since there are not special categories for other specific tools or technology, this appears to be a reasonable action. However, the panel does acknowledge that familiarity with computer operations and keyboarding are important skills in the workplace.

Summary of Literature Review:

Eleven sources, listed below, were found to include some aspect of the competency "uses computers to process information" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for using computers to process information. However, several sources also include the physical skills associated with computer use and knowledge of computer operations in relation to information management. Many mention specific computer applications, such as accessing the Internet and using word processing, spreadsheet, database, and statistical programs. There are many references to selecting and applying technology, so it may be helpful to refer to the definitions for those competencies.

List of Sources:

Arizona Workplace Skills Standards (Draft)

Students demonstrate technological literacy for productivity in the workplace, which includes demonstrating basic computer operation skills in a variety of applications to organize information, and using technology to organize information resources such as library and interlibrary catalog databases.

Chatham-Savannah Compact

Uses computers to process information: Uses a computer for word processing, completes forms on a computer, uses a computer for composition, and locates information on a computer.

Colorado Department of Education

Computer skills: Becomes aware of computer functions, inputs and accesses data from computer, has experience with computer programs, and understands issues associated with computer use.

Fort Worth: Project C^3

Ability to solve problems using multiple software packages (e.g., word-processing, spreadsheet, database, desktop publishing).

Kansas Competency Index of Workplace Skills	Computer literacy: Performs power-up and power-down procedures, identifies parts of keyboard, and uses software applications.
Kentucky Council on School Performance Standards	Computer skills: Uses keyboards to input data and information into a computer; uses a computer to operate instructional programs; uses a computer to operate standard utility software programs such as word processing, spreadsheets, and statistical packages.
Project BEL	Among skills identified by surveyed employers: Demonstrates computer literacy.
Teaching the New Basic Skills	Among six time-of-hire skills: Uses personal computers to carry out simple tasks like word processing.
Vocational-Technical Consortium of States (VTECS)/Illinois	Demonstrating technological literacy: Demonstrates basic computer keyboard skills, utilizes computer skills, and recognizes the impact of technological changes on tasks and people.
Washington Workplace Competency Worksheet	Technology: Uses a computer for personal or work purposes, and is conversant with commonly applied technologies in various workplace applications.

SCANS Scales:

The panel recommends this competency be embedded in other SCANS competencies where appropriate. The behaviors of "acquiring, organizing, analyzing, and communicating information" in this competency are covered in the other information competencies, as well as the technology competencies, whether or not a computer is used to perform the tasks. Since there are not special categories for other specific tools or technology, this appears to be a reasonable action. However, the panel does acknowledge that familiarity with computer operations and keyboarding are important skills in the workplace.

On the recommendation of the panel, a scale was not developed for this competency.

SCANS—O*NET Crosswalk:

Comments: The context of "information" is presented differently in the SCANS frameworks versus the O*NET framework. SCANS constructed skill categories that address specific activities related to using information. O*NET distributed the use of information across many of its skill area definitions. For the SCANS skill of "using a computer to process information," there is a relationship to O*NET Technical Skills "Programming."

Other O*NET Links: The O*NET framework contains other references to using computer to process information. These include:

Programming (Worker Requirements): Writing computer programs for various purposes.

Interacting with computers (Occupational Requirements): Controlling computer functions by using programs, setting up functions, writing software, or otherwise communicating with computer systems.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information **Uses computers to process information** Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information **Uses computers to process information** Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information **Uses computers to process information** Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

Participates as a Member of a Team

SCANS Definition: Works cooperatively with others and contributes to group with ideas, suggestions, and effort.

Demonstrating competence in participating as a member of a team includes doing own share of work necessary to complete a project; encouraging team members by listening and responding appropriately to their contributions; building on individual team members' strengths; resolving differences for the benefit of the team; taking personal responsibility for accomplishing goals; and responsibly challenging existing procedures, policies, or authorities.

Panel Comments: None.

Summary of Literature Review: Twenty-eight sources, listed below, were found to include some aspect of the competency "participates as a member of a team" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for participating as a member of a team. However, several sources also include the following behaviors: resolving differences of opinion (maintenance of the team), negotiating, mediating, sharing goals and responsibility, consensus building, compromising, and participating actively. There are many references to social skills, so it may be helpful to refer to that skill while refining this one.

List of Sources:

AccuVision Workplace Success Skills System	Interacting with others: Helps resolve differences of opinion or interpersonal conflicts (e.g., takes action to stop bickering, encourages cooperation).
AON Consulting Survey of Human Resource Trends	Interpersonal/team skills.
Arizona Workplace Skills Standards (Draft)	Students work individually and collaboratively within team settings to accomplish objectives, which includes identifying ways to build mutual trust and respect and develop an action plan for negotiating concerns; analyzing the difference between individuals and group decisions and accomplishments; exerting a high level of effort and perseverance toward goal attainment, as a member of a team; and assuming leadership roles in team settings.
Australia's Key Competencies	Working with others and in teams: Works effectively as a member of a team to achieve a shared goal.

California Career-Technical Assessment Project (CTAP)	Interpersonal skills: Understands key concepts in group dynamics, works cooperatively with others, shares responsibility.
Chatham-Savannah Compact	Participates as a member of a team: Recognizes how feelings affect others and vice-versa, identifies principles of perception and understands how perceptions affect interpersonal relationships on the job, gives and receives feedback, functions effectively as a group member and group leader, accepts responsibility on the job, and displays ability to self-manage.
Colorado Department of Education	Team participation skills: Helps identify mission/goals of team, participates in team decision-making, follows rules and procedures set by team, communicates with team members, shows sensitivity to ideas of team members, cooperates with team members, and supports actions taken by team.
Employer's Choice	Cooperates with others: Works as a team member.
Equipped for the Future	Interpersonal skills: Work with family members, neighbors or coworkers to get things done; Use principles of group dynamics and consensus-building strategies, building on the strengths of individual group members including self. Knowledge domains: Includes knowledge about the purposes of groups and teams, the stages of their development and their dynamics, and the processes that make groups and teams effective.
Framework for Developing Skill Standards for Workplace Literacy	Participates actively in team meetings, listening to the input of others and expressing his/her own contributions; and mediates a conflict within a team or with co-workers before it becomes destructive.
Investing in Our Children	Among skills important for entry-level workers: Functions as a team member.
Kansas Business Survey	Among skills identified by surveyed businesses: Demonstrates teamwork skills.
Kansas Competency Index of Workplace Skills	Team member participation: Establishes team standards.

Mexico's Occupational Analysis Study	Interaction with co-workers: [Level 5] Participate in a team to explore and generate new ideas, develop new products or service or design new procedures for carrying out work activities. [Level 4] Establish and achieve group goals, organize group activities, analyze and solve problems as a team, share information with others, and recommend actions to be taken. [Level 3] Coordinate working hours, negotiate with other people on how work should be done, supply information on activities and operations so as to complete them with specified results. [Level 2] Seek information or support from co-workers in order to complete work activities, informing supervisors or co-workers of problems at work. [Level 1] Receive instructions from others or seek guidance about work activities from a supervisor. Interpersonal/social skills: [Level 5] Practice leadership and motivation to perform negotiation, persuasion, and promotion to achieve the desired goals, get and keep the confidence of those with whom they interact, promote the professional and personal development of peers and subordinates. [Level 2] Respond adequately to diverse situations, accept personal doubts and criticism of their work with maturity, adapt, easily, to different socio-cultural characteristics, and resolve inter-personnel conflicts in the workplace. [Level 3] Understand the diversity of opinions within a group, and coordinate and propitiates a joint effort toward the achievement of objectives. [Level 2] Show positive and cooperative attitudes at work, promote a favorable image of the company, adapt to changes in the work structure and procedures, be sensitive and support the ideas and suggestions of others, be trustworthy and responsible. [Level 1] Maintain a respectful relationship with peers and superiors show a willingness to listen to others without interrupting, respect the rights of others, and respect internal regulations regarding scheduling, work clothes, and security.
Michigan Employability Skills	Teamwork skills: Actively participates in a group, knows the group's rules and values, listens to other members, expresses ideas to other group members, is sensitive to group members' ideas and views, is willing to compromise to best accomplish goals, operates as a leader or follower to best accomplish goals.
National Vocational Qualifications (NVQ)	Working with others.
New Standards Project	Working with others and in teams: Defines purposes and objectives to be achieved by working with others; and establishes roles, procedures, and timeframes, taking into account different perspectives; and negotiates with others to define objectives and, where necessary, to monitor and redefine them. Understanding and designing systems: Communicates and negotiates with teams of others who share an interest in the product or process.
New York State Education Department	Expanded basics: Demonstrates ability to work as a team member.
Quality of American High School Graduates	Among skills important to employers surveyed: Gets along with others; is a good team member.

BEST COPY AVAILABLE

Skill Demand, Changing Work Organization, and Performance	Workplace competencies: Work in teams.
Texas Workplace Skills Inventory	Among skills identified as essential: Interacts with co-workers to accomplish a task.
Training America: Strategies for the Nation	Among skills identified by employers: Demonstrates interpersonal teamwork skills.
Vocational-Technical Consortium of States (VTECS)/Illinois	Demonstrating team work: Identifies style of leadership required for effective team work, works productively with others, establishes the team's operating procedures, and evaluates outcomes.
Washington Workplace Competency Worksheet	Interpersonal and group: Identifies and assesses role and norms in a team, understands different work environments, understands own effects on team, demonstrates effective interteam communication, and understands own work in the context of the work of others, serves as a skilled team member, and understands concepts of teamwork, courtesy, and cooperation.
Work Keys	Choose behaviors or actions that best support the team and contribute to work performance.
Workforce Development Region IX Needs Assessment Survey Report	Interpersonal skills and the ability to work with group settings, teamwork.
Workplace Basics (Carnevale)	Working with others as a team to achieve organizational and personal goals.
Young People's Participation in Post-Compulsory Education and Training	Personal and interpersonal: Demonstrates team skills.

SCANS Scales:

Level 5	Establishes and maintains teams. Links team with management and with the overall goals of the organization.
Level 4	Acts as a facilitator and works to maintain the team. Builds on individual team members' strengths. Eases tension and builds cooperation. Resolves differences for the benefit of the team.
Level 3	Acts as a team-builder and consensus-builder. Helps identify the mission and goals of the team. Encourages team members by listening and responding appropriately to their contributions.
Level 2	Operates as an active member of the team. Contributes to the team with ideas, suggestions, and effort. Participates in team decision-making. Follows rules and procedures set by team. Supports actions taken by team.
Level 1	Works cooperatively with others on a team. Takes responsibility for doing own share of work necessary to complete a project.

SCANS Scale Rationale:

Proactive toward tasks
↑
Reactive toward tasks

SCANS—O*NET Crosswalk:

Comments: No equivalent. SCANS "Participates as a Member of a Team" relates to O*NET "Coordination." However, SCANS emphasizes the proactive part of being involved in a team and working as a team member. Although O*NET "Coordination" is a condition of working in a team, it has broader applications beyond just teams. "Coordination" alone does not equal "Participates as a Member of a Team."

Other O*NET Links:

The O*NET framework contains other references to participating as a Team Member. These include:

Coordination (Worker Requirements): Is able to structure and adjust activities in accordance with the needs of others anticipating their actions and the demands placed on them.

Developing and building teams (Occupational Requirement): Encouraging and building mutual trust, respect, and cooperation among team members.

Coordinating the work activities of a team (Occupational Requirements): Coordinating members of a work group to accomplish tasks.

Assessments:

Industrial Psychology International, Ltd. – Fluency	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Interprets and communicates information **Participates as a member of a team** Serves clients/customers Negotiates to arrive at a decision Speaking Creative thinking
Industrial Psychology International, Ltd. – Verbal Proficiency Assessment (VPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information **Participates as a member of a team** Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information **Participates as a member of a team** Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

WORKPLACE COMPETENCIES: Interpersonal

Teaches Others

SCANS Definition:

Helps others learn.

Demonstrating competence in teaching others includes helping others to apply related concepts and theories to tasks through coaching or other means; identifying training needs; conveying job information to allow others to see its applicability and relevance to tasks; and assessing performance and providing constructive feedback/reinforcement.

Panel Comments:

None.

Summary of Literature Review:

Seven sources, listed below, were found to include some aspect of the competency "teaches others" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for teaching others. However, several sources include the behaviors of assessing the needs and current knowledge of others, teaching by example, and providing positive feedback. There are many references to social skills, so it may be helpful to refer to that definition while refining this one.

List of Sources:

AccuVision Workplace Success Skills System	Interacting with others: Assists those with less experience (e.g., helps people learn new tasks); provides colleagues with constructive guidance (e.g., offers others suggestions about how to improve quality or productivity); acknowledges the positive work efforts and accomplishments of others (e.g., thanks others for help or assistance given, notices and mentions jobs done well by others); encourages others to do high-quality work (e.g., sets high personal standards, discusses the importance of quality with others, encourages taking the time to do the job right the first time).
Consensus Framework for Workplace Readiness	Participates in the work organization: Teaches and learns from others on the job.
Equipped for the Future	Common activities: Helps others succeed by setting an example, providing training, or giving other kinds of assistance; assesses the needs of others and uses a variety of techniques to assist them or develop their skills; Model of appropriate attitudes, actions, and communication for others.
Future Works	Positive skills or attributes: Demonstrates teaching capacity.
High School Curriculum Study	Among skills identified by survey results: Directs the work of others.

New Standards Project	Learning and teaching on demand: Recognizes that colleagues may need help and knows how to offer help and support that does not offend; explains things to others in ways that take into account what the listener already knows and understands.
Skill Demand, Changing Work Organization and Performance	Workplace competencies: Teaches.
Washington Workplace Competency Worksheet	Interpersonal and group: Serves as a teacher for new workers.

SCANS Scales:

SCANS Scale Rationale:	Level 5	Acts as a mentor and works to further others' careers by promoting their professional and personal development.
Greater scope of training; greater complexity of content; and superior to subordinate relationship	Level 4	Coaches co-workers and/or subordinates on all parts of their jobs. Helps others to apply related concepts and theories to tasks. Determines learning needs of others and recommends appropriate training programs.
	Level 3	Teaches others in multiple-step tasks. Assesses overall job performance and offers constructive feedback.
↑ *Smaller scope of training; basic or routine content; and equal or similar status relationship*	Level 2	Conveys job information to allow others to see its applicability and relevance to tasks. Assesses performance on a series of tasks and offers feedback.
	Level 1	Teaches a familiar task to inexperienced co-workers through methods such as demonstration and explanation. Assesses performance on a specific task and offers immediate feedback.

SCANS—O*NET Crosswalk:

Instructing: (Technical Definition) Can develop the skills of others attending to their needs and current level of mastery. (Operational Definition) Teaching others how to do something.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two intend to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Scale Rationale:

Greater scope of training; greater complexity of content; and superior to subordinate relationship

↑

Smaller scope of training; basic or routine content; and equal or similar status relationship

SCANS Teaches Others			*O*NET Instructing*	
Level 5	Acts as a mentor and works to further others' careers by promoting their professional and personal development.			
Level 4	Coaches co-workers and/or subordinates on all parts of their jobs. Helps others to apply related concepts and theories to tasks. Determines learning needs of others and recommends appropriate training programs.	➨	High	Demonstrating surgical procedures to interns in a teaching hospital.
Level 3	Teaches others in multiple-step tasks. Assesses overall job performance and offers constructive feedback.	➨	Medium	Instructing a co-worker in how to operate a software program.
Level 2	Conveys job information to allow others to see its applicability and relevance to tasks. Assesses performance on a series of tasks and offers feedback.			
Level 1	Teaches a familiar task to inexperienced co-workers through methods such as demonstration and/or explanation. Assesses performance on a specific task and offers immediate feedback.	➨	Low	Instructing a new employee in the use of a time clock.

Other O*NET Links:

The O*NET framework contains other references to teaching others. These include:

Teaching others (Occupational Requirements): Identifying educational needs and developing (or having other develop) formal training programs or classes.

Coaching and developing others (Occupational Requirements): Identifying developmental needs of others and coaching or instructing others to improve their knowledge or skills.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information **Teaches others** Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd.-- Verbal Proficiency Assessment (VPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team **Teaches others** Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honest

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team **Teaches others** Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

WORKPLACE COMPETENCIES: Interpersonal

Serves Clients/Customers

SCANS Definition:	Works and communicates with clients and customers to satisfy their expectations. Demonstrating competence in serving clients and customers includes actively listening to customers to avoid misunderstandings and identifying needs; communicating in a positive manner especially when handling complaints or conflict; efficiently obtaining additional resources to satisfy client needs.
Panel Comments:	None.
Summary of Literature Review:	Six sources, listed below, were found to include some aspect of the competency "serves clients/customers" as part of their definition of necessary workplace skills. In general, the sources support the SCANS definition for serving clients/customers. However, many sources also include the behavior of explaining advantages and disadvantages of products and services to clients and customers. There are also references to communication skills, so it may be helpful to refer to those definitions while refining this one.
List of Sources:	
Australia's Key Competencies	Working with others and in teams: Understands and responds to the needs of a client.
Chatham-Savannah Compact	Serves clients and customers: Uses attentive posture and maintains eye contact during listening, chooses words/manner of expression appropriate to the workplace, handles complaints, and explains products and services.
Consensus Framework for Workplace Readiness	Interpersonal: Meets the needs of others, such as clients or customers.
Mexico's Occupational Analysis Study	Attention to clients: [Level5] Analyze and evaluate customer needs, make decisions on products/services or future markets, and design and recommend new products and services. [Level 4] Explain advantages/disadvantages of products to clients, instruct clients through demonstration or using manuals to explain how equipment is used, negotiate with clients/suppliers or resolve differences in order to reach an agreement. [Level 3] Contact clients to sell products/service, use client feedback to resolve problems or recommend direct actions. [Level 2] Provide basic client assistance by listening to their needs and responding adequately, receive, order, select, and exhibit products and services. [Level 1] Provide basic support to customers contact, including reception and orientation of clients at suitable places so that their problems may be solved and the preparation of areas to receive clients.
Texas Workplace Skills Inventory	Among skills identified as essential: Exhibits appropriate behavior when dealing with clients.

Workplace Basics (Carnevale) Listens effectively to customers and co-workers and responds appropriately.

SCANS Scales:

	Level 5	Deals with complex client needs involving major problems or clients with difficult behaviors.
SCANS Scale Rationale:	Level 4	Anticipates client/customer needs and makes recommendations for improvements.
Proactive toward tasks	Level 3	Analyzes and evaluates clients'/customers' existing and future needs. Establishes productive relationships. Makes proposals in oral or written form.
↑	Level 2	Exceeds client/customer expectations of service. Resolves client/customer problem within corporate or organizational culture.
Reactive toward tasks	Level 1	Meets minimum client/customer expectations. Knows where to go for help or where to refer client/customer.

SCANS—O*NET Crosswalk: Service Orientation: (Technical Definition) Attempts to provide others with needed services anticipating their needs and responding to their concerns. (Operational Definition) Actively looking for ways to help people.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS *Serves Clients/Customers*			**O*NET** *Service Orientation*	
Level 5	Deals with complex client needs involving a major problems or clients with difficult behaviors.	➡	High	Directing relief agency operations in a disaster area.
Level 4	Anticipates client/customer needs and makes recommendations for improvements.			
Level 3	Analyzes and evaluates clients/customers' existing and future needs. Establishes productive relationships. Makes proposals in oral or written form.			
Level 2	Exceeds client/customer expectations of service. Resolves client/customer problems within corporate or organizational culture.	➡	Medium	Making flight reservations for customers, using airline reservation system.
Level 1	Meets minimum client/customer expectations. Knows where to go for help or where to refer client/customer.	➡	Low	Asking customers if they would like cups of coffee.

SCANS Scale Rationale:

Proactive toward tasks
↑
Reactive toward tasks

Other O*NET Links:

The O*NET framework contains other references to serving clients/customers. These include:

Performing for or working directly with the public (Occupational Requirements): Performing for people or dealing with the public, including serving persons in restaurants and stores, and receiving clients or guests.Selling or influencing others (Occupational Requirements): Convincing others to buy merchandise/goods, or otherwise changing their minds or actions.

Resolving conflicts and negotiating with others (Occupational Requirements): Handling complaints, arbitrating disputes, and resolving grievances.

Assessments:

Industrial Psychology International, Ltd. -- Fluency	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Interprets and communicates information Participates as a member of a team **Serves clients/customers** Negotiates to arrive at a decision Speaking Creative thinking

Industrial Psychology International, Ltd. --Verbal Proficiency Assessment (VPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others **Serves clients/customers** Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others **Serves clients/customers** Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

WORKPLACE COMPETENCIES: Interpersonal

Exercises Leadership

SCANS Definition:

Communicates thoughts, feelings, and ideas to justify a position; encourages, persuades, convinces, or otherwise motivates an individual or groups, including responsibly challenging existing procedures, policies, or authority.

Demonstrating competence in exercising leadership includes making positive use of the rules/values followed by others; justifying a position logically and appropriately; establishing credibility through competence and integrity; and taking minority viewpoints into consideration.

Panel Comments:

One should consider the outcome, the nature of the organization, and the leadership style when defining this competency.

Summary of Literature Review:

Seventeen sources, listed below, were found to include some aspect of the competency "exercises leadership" in their definition of necessary workplace skills. In general, these sources support the SCANS definition for exercising leadership. However, several sources include the behaviors of coaching, evaluating, mentoring, and influencing others.

List of Sources:

AccuVision Workplace Success Skills System

Interacting with others: Encourages others to maintain good work habits (e.g., comply with safe work practices, come to work on time, work productively).

AON Consulting Survey of Human Resource Trends

Leadership.

ASTD Update: Basic Skills

Group and organizational effectiveness skills: Demonstrates leadership.

California Career-Technical Assessment Project (CTAP)

Interpersonal skills: Assumes leadership roles.

Colorado Department of Education	Work activity skills: Suggests or makes workplace improvements.
Consensus Framework for Workplace Readiness	Participate in the work organization: Initiates suggestions for improving the organization.
Equipped for the Future	Provide leadership: Inspire, influence, direct and motivate others; take responsibility for results. Interpersonal skills: Use a variety of communication strategies to build a case for your views or strategies. Present in ways that persuade others to adopt a point of view, make desired changes in existing structures, and take action. Monitor the situation to determine whether actions make a difference. Initiate and manage plans for action and change. Organize and inspire others to act on them. Share responsibility and delegate to others. Coach and mentor others and facilitate the work of groups. Evaluate and monitor the achievement of results to inform further actions. Thinking skills: Organizes and applies information correctly.
Future Work	Executive and managerial skills: Demonstrates entrepreneurship, leadership, and decision-making skills.
Getting a Job After College	Adaptive skills: Exhibits assertiveness.
Job Skills for the 21st Century	People skills: Leadership.
Mexico's Occupational Analysis Study	Interpersonal/social skills: [Level 5] Practice leadership and motivation to perform negotiation, persuasion, and promotion to achieve the desired goals, get and keep the confidence of those with whom they interact, promote the professional and personal development of peers and subordinates. [Level 4] Respond adequately to diverse situations, accept personal doubts and criticism of their work with maturity, adapt, easily, to different socio-cultural characteristics, and resolve interpersonnel conflicts in the workplace. [Level 3] Understand the diversity of opinions within a group, and coordinate and propitiates a joint effort toward the achievement of objectives. [Level 2] Show positive and cooperative attitudes at work, promote a favorable image of the company, adapt to changes in the work structure and procedures, be sensitive and support the ideas and suggestions of others, be trustworthy and responsible. [Level 1] Maintain a respectful relationship with peers and superiors show a willingness to listen to others without interrupting, respect the rights of others, and respect internal regulations regarding scheduling, work clothes, and security.
Project BEL	Among skills identified by surveyed employers: Demonstrates leadership and organizational effectiveness.

Training America: Strategies for the Nation	Among skills identified by employers: Demonstrates organizational effectiveness and leadership.
Washington Workplace Competency Worksheet	Interpersonal and group: Responsibly challenge existing procedures.
Workplace Basics (Carnevale)	Assume leadership responsibilities as necessary.
Young People's Participation in Post-Compulsory Education and Training	Personal and interpersonal: Demonstrates initiative and leadership.

SCANS Scales:

SCANS Scale Rationale:

Greater scope of tasks and degree of influence
↑
Lesser scope of tasks and degree of influence

Level 5	Inspires and guides the development of organizational vision, mission, and goals.
Level 4	Connects group with other groups and with the larger mission of an organization. Creates a cooperative atmosphere. Overcomes obstacles and responsibly challenges existing procedures, policies, or authority.
Level 3	Takes responsibility for a group of people to accomplish goals. Inspires and guides others and delegates as necessary. Inspires confidence and trust.
Level 2	Persuades, convinces, or motivates an individual to adopt a point of view, make changes, or take action. Logically communicates thoughts, feelings, and ideas to justify a position.
Level 1	Serves as a role model by accepting responsibility for own actions.

SCANS—O*NET Crosswalk:

Comments: No equivalent. This SCANS skill area is related to O*NET "Persuasion," yet SCANS has specific implications to leading others. "Persuasion" is a part of leadership, but the definition lacks reference to motivating others and the personal characteristics and responsibilities of leading others.

Other O*NET Links:

The O*NET framework contains other references to exercising leadership. These include:

Persuasion (Worker Requirements): Can present information in such a way as to influence others' attitudes and behaviors.

Leadership Orientation (Worker Characteristics): Job requires a willingness to lead, take charge, and offer opinions and direction.

Guiding, directing, and motivating subordinates (Occupational Requirements): Providing guidance and direction to subordinates, including setting performance standards and monitoring subordinates.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others **Exercises leadership** Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information **Exercises leadership** Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking

Industrial Psychology International, Ltd. -- Verbal Proficiency Assessment	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates human resources Interprets and communicates information Participates as a member of a team Teaches others Serves clients/customers **Exercises leadership** Negotiates to arrive at a decision Understands systems Speaking
Industrial Psychology International, Ltd.-- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers **Exercises leadership** Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

WORKPLACE COMPETENCIES: Interpersonal

Negotiates to Arrive at a Decision

SCANS Definition: Works toward an agreement that may involve exchanging specific resources or resolving divergent interests.

Demonstrating competence in negotiating to arrive at a decision involves researching opposition and the history of the conflict; setting realistic and attainable goals; presenting facts and arguments; listening to and reflecting on what has been said; clarifying problems and resolving conflicts; adjusting quickly to new facts/ideas; proposing and examining possible options; and making reasonable compromises.

Panel Comments: None.

Summary of Literature Review: Twelve sources, listed below, were found to include some aspect of the competency "negotiates to arrive at a decision" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for negotiating to arrive at a decision. However, sources include the behavior of consensus building. There are also references to teamwork and communication, so it may be helpful to refer to those definitions while refining this one.

List of Sources:

AccuVision Workplace Success Skills System	Interacting with others: Deals effectively with angry or demanding people (e.g., avoids becoming angry, acts as a concerned peacekeeper, keeps disagreements on a constructive level).
ASTD Update: Basic Skills	Group and organizational effectiveness skills: Demonstrates negotiation skills.
California Career-Technical Assessment Project (CTAP)	Interpersonal skills: Conflict resolution and negotiation.
Chatham-Savannah Compact	Negotiates: Interacts with co-workers to accomplish a task.
Colorado Department of Education	Interpersonal skills: Demonstrates ability to negotiate differences with others.

Consensus Framework for Workplace Readiness	Interpersonal: Builds consensus, deals with conflict effectively, and negotiates agreements.
Job Skills for the 21st Century	People skills: Negotiation.
Kansas Competency Index of Workplace Skills	Team member participation: Negotiates a compromise.
Training America: Strategies for the Nation	Among skills identified by employers: Demonstrates negotiation skills.
Washington Basic Skills	Persuading and negotiating: Handles complaints, and interacts with co-workers to accomplish tasks.
Workplace Basics (Carnevale)	Negotiating to resolve conflict.
Young People's Participation in Post-Compulsory Education and Training	Personal and interpersonal: Negotiates.

SCANS Scales:

SCANS Scale Rationale:

Complex agreements and greater degree of control

↑

Simple agreements and lesser degree of control

Level 5	Facilitates negotiation to reach long-term goal-achieving decisions that require consensus.
Level 4	Performs a series of negotiations with a short-term goal in mind. "Sees through others' eyes" in order to understand their perspectives.
Level 3	Negotiates within a group setting. Sets realistic and attainable goals. Generates potential options for compromise.
Level 2	Negotiates with another employee or supervisor through discussion and compromise to reach a decision.
Level 1	Demonstrates a willingness to accept or accommodate another's position or point of view.

SCANS—O*NET Crosswalk:

Negotiation: (Technical Definition) Can bargain as a representative of others or can bargain for one's self in situations calling for a transaction. (Operational Definition) Bringing others together and trying to reconcile differences.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Scale Rationale:

Complex agreements and greater degree of control
↑
Simple agreements and lesser degree of control

SCANS *Negotiates to Arrive at a Decision*			O*NET Negotiation	
Level 5	Facilitates negotiation to reach long-term goal-achieving decisions that require consensus.	➨	High	Working as an ambassador in negotiating a new treaty.
Level 4	Performs a series of negotiations with a short-term goal in mind. “Sees through others’ eyes” in order to understand their perspectives.	➨	Medium	Contracting with a wholesaler to sell items at a given cost.
Level 3	Negotiates within a group setting. Sets realistic and attainable goals. Generates potential options for compromise.			
Level 2	Negotiates with another employee or supervisor through discussion and compromise to reach a decision.	➨	Low	Presenting justification to a manager for altering work schedule.
Level 1	Demonstrates a willingness to accept or accommodate another’s position or point of view.			

Other O*NET Links:

The O*NET framework contains other references to allocating time. These include:

Resolving conflicts and negotiating with others (Occupational Requirements): Handling complaints, arbitrating disputes, and resolving grievances.

Assessments:

Industrial Psychology International, Ltd. -- Fluency	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Interprets and communicates information Participates as a member of a team Serves clients/customers **Negotiates to arrive at a decision** Speaking Creative thinking
Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership **Negotiates to arrive at a decision** Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership **Negotiates to arrive at a decision** Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking
Industrial Psychology International, Ltd. -- Verbal Proficiency Assessment	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates human resources Interprets and communicates information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership **Negotiates to arrive at a decision** Understands systems Speaking

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership **Negotiates to arrive at a decision** Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

WORKPLACE COMPETENCIES: Interpersonal

Works with Cultural Diversity

SCANS Definition:

Works well with men and women and with a variety of ethnic, social, or educational backgrounds.

Demonstrating competence in working with cultural diversity involves understanding one's own culture and those of others and how they differ; respecting the rights of others while helping them make cultural adjustments where necessary; basing impressions on individual performance, not on stereotypes; and understanding concerns of members of other ethnic and gender groups.

Panel Comments:

The panel recommends adding persons with disabilities to the definition.

Summary of Literature Review:

Fourteen sources, listed below, were found to include some aspect of the competency "works with cultural diversity" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for working with cultural diversity. However, several sources also include working internationally and working with disabled people. Several sources refer to values, beliefs, cultures, and history, and there are references to social and team skills. Therefore, it may be helpful to refer to those definitions while refining this one.

List of Sources:

ASTD Update: Basic Skills	Individual competence skills: Demonstrates understanding of culture.
California Career-Technical Assessment Project (CTAP)	Interpersonal skills: Demonstrates cooperative working relationships with others across gender and cultural groups.
Colorado Department of Education	Cross-cultural skills: Understands the impact of cross-cultural/international relationships, demonstrates sensitivity to cultural differences, interacts with people of different cultures, and takes opportunities to experience new places and people.
Consensus Framework for Workplace Readiness	Interpersonal: Works with all members of the workforce.

Equipped for the Future	Common activities: Respect and appreciate the values, beliefs, cultures, and history of others. Use this appreciation to counteract prejudice and stereotypes. Interpersonal skills: Work with others across differences in culture, ethnicity, social background, belief, or physical abilities. Knowledge domains: Includes knowing the meaning of traditions and culture in our lives, and the influence of language on culture.
Framework for Developing Skill Standards for Workplace Literacy	Cross-functional skills: Works in a team with people with diverse personalities and cultures.
Job Skills for the 21st Century	People skills: Cultural diversity.
Kansas Competency Index of Workplace Skills	Self-management: Demonstrates respect for the opinions, customs, and individual differences of others.
México's Occupational Analysis Study	Interpersonal/social skills: [Level 5] Practice leadership and motivation to perform negotiation, persuasion, and promotion to achieve the desired goals, get and keep the confidence of those with whom they interact, promote the professional and personal development of peers and subordinates. [Level 4] Respond adequately to diverse situations, accept personal doubts and criticism of their work with maturity, adapt, easily, to different socio-cultural characteristics, and resolve inter-personnel conflicts in the workplace. [Level 3] Understand the diversity of opinions within a group, and coordinate and propitiates a joint effort toward the achievement of objectives. [Level 2] Show positive and cooperative attitudes at work, promote a favorable image of the company, adapt to changes in the work structure and procedures, be sensitive and support the ideas and suggestions of others, be trustworthy and responsible. [Level 1] Maintain a respectful relationship with peers and superiors show a willingness to listen to others without interrupting, respect the rights of others, and respect internal regulations regarding scheduling, work clothes, and security.
Michigan Employability Skills	Teamwork skills: Works with people of differing backgrounds.
Teaching the New Basic Skills	Among six time-of-hire skills: Works in groups with people of various backgrounds.

Texas Workplace Skills Inventory	Among skills identified as essential: Works well with people from culturally diverse backgrounds.
Washington Workplace Competency Worksheet	Interpersonal and group: Works effectively with colleagues from diverse backgrounds. Personal qualities: Understands the value of ethnic and gender equality.
Workforce LA	Social maturity: Is cooperative and can work in culturally diverse workplaces.

SCANS Scales:

SCANS Scale Rationale:

Proactive toward tasks

↑

Reactive toward tasks

Level 5	Promotes universal acceptance of all groups.
Level 4	Appreciates across-group similarities. Promotes acceptance of other groups within own group.
Level 3	Understands and respects the concerns of members of other groups. Makes a conscientious effort to adapt own behavior to accommodate people from other groups.
Level 2	Accepts differences between self and other groups with which one interacts. Demonstrates courtesy in interactions with people from other cultures.
Level 1	Works with others from different backgrounds and points of view to achieve workplace goals.

SCANS—O*NET Crosswalk:

Comments: No equivalent. SCANS "Works with Cultural Diversity" specifically emphasizes relating to gender, ethnic, social, and educational issues, which is implied in O*NET "Social Perceptiveness" but not explicitly stated.

Other O*NET Links:

The O*NET framework contains other references to working with cultural diversity. These include:

Social Perceptiveness (Worker Requirements): Can accurately diagnose and appraise social situations attending to others' reactions within the broader context of ongoing social interaction.

Assessments:

No assessments listed.

WORKPLACE COMPETENCIES: Systems

Understands Systems

SCANS Definition: Knows how social, organizational, and technological systems work and operates effectively within them.

Demonstrating competence in understanding systems involves knowing how a system's structures relate to goals; responding to the demands of the system/organization; knowing the right people to ask for information and where to get resources; and functioning within the formal and informal codes of the social/organizational system.

Panel Comments: The definition of "systems" is too broad. In trying to cover all technical, social, and organizational systems, the competencies lose a great deal of meaning and applicability. Separating "systems" into such categories would be more useful, yet this would not fit the SCANS framework.

Summary of Literature Review: Twenty sources, listed below, were found to include some aspect of the competency "understands systems" as part of their definition of necessary workplace skills. In general, these sources suggest that understanding systems is too broad; "systems" needs to be defined. According to the sources, systems can be technological, organizational, business, community, economic, legal, and global.

List of Sources:

AON Consulting Survey of Human Resource Trends

Work orientation.

Arizona Workplace Skills Standards (Draft)

Students illustrate how social, organizational, and technological systems function, which includes identifying the factors impacting the level of effectiveness of systems. This framework includes a definition: A system equals an organized framework made up of interrelated components acting together as a whole, in which a change in one component may affect the entire operation.

Colorado Department of Education

Business economic skills: Understands business organizations; understands factors affecting profitability; understands business competition; knows about processes of marketing; knows about processes of production; and understands business costs.

Knows how to evaluate products and services, access community resources/services, compute working hours/wages, handle financial affairs, handle records of income and expenses, make price-quality comparisons, prepare state and federal tax forms, evaluate insurance programs, and determine credit costs.

Understands legal rights in agreements; and uses various forms of transportation.

Work activities: Knows about basic employee rights/student rights, knows about basic employee/student responsibilities, knows basic steps in getting a raise or promotion, knows how to terminate employment/school positions.

Personal economic skills: Knows how to evaluate products and services, access community resources/services, compute working hours/wages, handle financial affairs, handle records of income and expenses, make price-quality comparisons, prepare state and federal tax forms, evaluate insurance programs, and determine credit costs; understands legal rights in agreements; and uses various forms of transportation.

Consensus Framework for Workplace Readiness	Workplace systems: Determines how an individual job fits into the overall organization, how the organization fits into the industry, and how the industry fits into the overall economy, in order to: 1) identify the subparts of the system, 2) know how the parts fit together, and 3) understand how the work flows through the system.
Equipped for the Future	Knowledge domains: Includes understanding the historical context of current issues and opportunities, knowing more about what came before and lessons learned. The historical contexts include family, community, workplace, nation, and world.
Future Work	Social management skills: Demonstrates expertise in community relations. Specialty skills: Exhibits international/global orientation.
High School and the Changing Workplace: The Employer's View	Social and economic studies: Has knowledge of the history of present-day American Society; the political, economic, and social systems of the United States and other countries; the fundamentals of economics, including the roles of money, capital investment, product pricing, cost, profit, productivity, and market forces such as supply and demand, the concept of trade-offs and the differences between economic principles, facts, and value judgments; the forms and functions of local, state, and federal governments; the rights and responsibilities of citizens; and the civil rights and justice in a free society.
Kansas Business Survey	Among skills identified by surveyed businesses: Demonstrates business/management skills.
Kentucky Council on School Performance Standards	Knowledge of humanities: Understands culture, the relationship of environment to human activity, location, place, region, artistic style, creative expression, choreography, and music elements. Knowledge of social studies: Knows the structure and functions of political institutions, rights and responsibilities in rule of law, federalism, democracy, equality, geography, norms and mores, competition and market structure, and acculturation. Practical living skills: Includes housing, consumerism, parenthood, marriage, and work and employment. Connecting and integrating knowledge: Makes historical connections using new knowledge, makes connections with basic knowledge, identifies applications of knowledge in the real world, describes methods for advancing the knowledge or the field of knowledge in which the content belongs, describes the contributions or potential contributions of the knowledge to society, identifies personal relevance or potential personal relevance of the knowledge, and describes relationships of the new knowledge with other fields of knowledge.

Mexico's Occupational Analysis Study	Organizational aspects: [Level 5] Have knowledge of the organizing structure, functions, long-term plans, etc, of a business's operations and services, possess a vision of the organization and its function within the state, national and international economic contexts, and be committed to the most important objectives of the organization. [Level 4] Consider the operation of the organization as one unit, understand the details of each unit and how each one affects the whole, be involved in greater tasks and duties that demand different resources and relationships between groups, use leadership to direct tasks, create new and improved methods within the company, be involved in every phase of customer relations, and understand economic tendencies and how they affect the organization and take advantage of these tendencies. [Level 3] Be familiar with the general functions of an organization, knowing how it operates and the function of each group, work well in all groups, use basic management abilities in small groups to perform routine tasks, have knowledge of workplace procedures and regulations, supply information and services to clients, demonstrate greater commitment to the work and the organization, understand how the organization relates to the local market. [Level 2] Aware of own job function and its relationship to the duties of others, make administrative decisions regarding time and resources that affect a person or a group, have basic knowledge of rules and procedures, provides basic services to clients. [Level 1] Aware of one's own work and job security, perform tasks without knowing their objective or the general results obtained.
New Standards Project	Understanding and designing systems: Understands that quality of their work is a function of the work of others inside and outside the organization.
New York State Education Department	Expanded basics: Understands personal and civic responsibilities.
Texas Workplace Skills Inventory	Among skills identified as essential: Understands policy manuals.
Vocational-Technical Consortium of States (VTECS)/Illinois	Accepting employment: Applies for a social security number, fills out personnel forms for employment, insurance application forms, federal and state tax forms, personal history forms, and union and professional group membership forms; accepts/rejects employment offers; selects employment benefit options. Interpreting the economics of work: Identifies the role of business in economic systems; describes the responsibilities of employees, management, and employers; investigates opportunities and options for business ownership, and assesses entrepreneurial skills.
Washington Basic Skills	Understanding financial and legal documents: Understands personal bills, tax forms, insurance forms, legal notices, contracts/agreements, business invoices, warranties, utility bills, and financial forms.
Washington Workplace Competency Worksheet	Sense of organization purpose: Senses where the organization is headed and what must be done to make a contribution, interprets written and unwritten values and goals of different types of organizations, determines compatibility of personal and organizational values, understands urgency in an organizational setting, and understands the concept of confidentiality in an organizational setting.
Work Keys	Sees the broad concepts that tie observations together.

Workforce Development Region IX Needs Assessment Survey Report	Global understanding and knowledge of government regulations.
Workplace Basics (Carnevale)	Today's workers must understand an organization's goals, operations, values, and culture to better determine how to operate in that system. The worker must also understand how to navigate in the system and influence others in positive ways.
Young People's Participation in Post-Compulsory Education and Training	Cultural understanding: Understands Australia's context, global issues, and the world of work.

SCANS Scales:

Level 5	Can explain the relationship of one system to other systems. Demonstrates an understanding of the rules and procedures of other systems. Can link and use different systems together to reach a goal.
Level 4	Can explain logic behind system arrangement in other work areas or components. Demonstrates an understanding of system-wide rules and procedures.
Level 3	Relates one system's components to another's, applying appropriate rules and procedures from one part of a system to another. Can provide details about major components, input, and output.
Level 2	Follows rules and procedures for interacting in an organization. For example, knows how to get questions answered.
Level 1	Identifies a system and one's place within a system. Knows where to get information or help when necessary.

SCANS Scale Rationale:

Greater level of detail and interaction

↑

Lesser level of detail and interaction

SCANS—O*NET Crosswalk:

Comments: No equivalent. This competency is organized differently in SCANS and O*NET. SCANS categorized their "system" skills into three competencies. O*NET categorized their "system" skills into six competencies. Some O*NET's skills could be interpreted as covering SCANS "understands systems," but this fit would be incomplete. Although it is recognized that there is a relationship, there is no equivalence.

Other O*NET Links:

The O*NET framework contains other references to understanding systems. These include:

Visioning (Worker Requirements): Create and apply a cognitive template or mental model describing how components of a system should interact under ideal conditions.

System perception (Worker Requirements): Understands how various components of a system work together and monitor key diagnostics to identify changes in system states and the nature of operations.

Identification of downstream consequences (Worker Requirements): Can identify the effects on different systems of a change in a given variable and how these changes will effect operations over time.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision **Understands systems** Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Numerical Proficiency Assessment (NPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Understands systems** Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Maintains and troubleshoots technology Mathematics

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision **Understands systems** Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking
Industrial Psychology International, Ltd .-- Verbal Proficiency Assessment (VPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates human resources Interprets and communicates information Participates as a team member Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision **Understands systems** Speaking

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information **Understands systems** Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Systems

Monitors and Corrects Performance

SCANS Definition:

Distinguishes trends and predicts the impact of actions on system operations, diagnoses deviations in the function of the system/organization, and takes the necessary action to correct performance.

Demonstrating competence includes identifying trends and gathering needed information about how the system is intended to function, detecting deviations from the system's intended purpose, troubleshooting the system, and making changes to rectify the system function and to ensure product quality.

Panel Comments:

None.

Summary of Literature Review:

Four sources, listed below, were found to include some aspect of the competency "monitors and corrects performance" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for monitoring and correcting performance. This skill is related to the understanding systems and the issues of defining systems. There are also several references to technology, so it may be helpful to refer to those definitions while refining this one.

List of Sources:

Assessing Literacy in the Workplace	Systems knowledge: Diagnoses, troubleshoots, and adjusts systems.
Chatham-Savannah Compact	Systems: Anticipates/predicts cause and effect relationships and charts performance for process control.
Future Work	Specialty skills: Maintains and repairs complex systems.
Mexico's Occupational Analysis Study	Handling, Storing, Conservation, and Manufacturing of Materials and Products: [Level 5] Evaluate existing systems and processes in order to develop new or improved processes and/or products. [Level 4] Diagnose problems concerning processes and the installation of equipment to manufacture products and suggest solutions. [Level 3] Manufacture, install, repair, and safeguard materials products, installations, or equipment, as well as carry out tests on products' characteristics and conditions. [Level 2] Follow specifications or instructions when channeling materials, products, equipment or machinery. [Level 1] Follow procedures or instructions in order to undertake a specific task, including physical activities such as classification, cleaning, loading, stacking, mixing, staring, and delivering materials and products.

SCANS Scales:

SCANS Scale Rationale:	Level 5	Identifies trends in performance and determines actions to prevent potential systems problems. Predicts effects of performance in other systems.
Greater complexity of diagnosis and proactive toward tasks ↑ *Lesser complexity of diagnosis and reactive toward tasks*	Level 4	Implements corrective action.
	Level 3	Determines whether system problems are caused by internal or external factors. Recommends solutions once causes are identified.
	Level 2	Performs simple diagnostics to identify the primary or most likely cause of a problem in the system. Documents or reports findings.
	Level 1	Monitors work activities or work station. Identifies an obvious system problem and reports it to the appropriate person.

SCANS—O*NET Crosswalk:

Comments: No equivalent. This competency is organized differently in SCANS and O*NET.SCANS categorized their "system" skills into three competencies. O*NET categorized their "system" skills into six competencies. There is also crossover to O*NET technology skills. Some O*NET's skills could be interpreted as covering SCANS "monitors and corrects performance," but this fit would be incomplete. Although it is recognized that there is a relationship, there is no equivalence.

Other O*NET Links:

The O*NET framework contains other references to monitoring and correcting performance. These include:

Operation monitoring (Worker Requirements): Monitor the inflow and operations involved in producing a product; identifying changes likely to affect production or continued operations.

System evaluation (Worker Requirements): Actively seeks out multiple sources of information about different system outcomes appraising the potential biases in this information and acting accordingly.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems **Monitors and corrects performance** Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Numerical Proficiency Assessment (NPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Understands systems **Monitors and corrects performance** Improves and designs systems Selects technology Applies technology to task Maintains and troubleshoots technology Mathematics

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems **Monitors and corrects performance** Improves and designs systems Selects technology Applies technology to task Creative thinking

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems **Monitors and corrects performance** Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Systems

Improves and Designs Systems

SCANS Definition:

Makes suggestions to modify existing systems to improve products and services and develops new or alternative systems.

Demonstrating competence includes making suggestions and recommending alternative system designs based on relevant feedback, and responsibly challenging the status quo to benefit the larger system.

Panel Comments:

None.

Summary of Literature Review:

Four sources, listed below, were found to include some aspect of the competency "improves and designs systems" as part of their definition of necessary workplace skills. In general, the sources support the SCANS definition for improving and designing systems. However, the sources did include the behaviors of evaluating systems and working within constraints. Again, this skill is related to understanding systems and the issues of defining systems.

List of Sources:

Chatham-Savannah Compact

Systems: Organizes the tasks to complete a process.

Mexico's Occupational Analysis Study

Handling, Storing, Conservation, and Manufacturing of Materials and Products: [Level 5] Evaluate existing systems and processes in order to develop new or improved processes and/or products. [Level 4] Diagnose problems concerning processes and the installation of equipment to manufacture products and suggest solutions. [Level 3] Manufacture, install, repair, and safeguard materials products, installations, or equipment, as well as carry out tests on products' characteristics and conditions. [Level 2] Follow specifications or instructions when channeling materials, products, equipment or machinery. [Level 1] Follow procedures or instructions in order to undertake a specific task, including physical activities such as classification, cleaning, loading, stacking, mixing, staring, and delivering materials and products.

New Standards Project

Understanding and designing systems: Organizes work within the constraints of input, time, and equipment available and outputs expected to develop new patterns of work flow or different approaches to quality checking; participates in design work; works with customers to develop or improve products.

Skill Demand, Changing Work Organization, and Performance

Workplace competencies: Makes changes and improves systems.

SCANS Scales:

SCANS Scale Rationale:

Proactive toward tasks
↑
Reactive toward tasks

Level 5	Designs and implements new systems. Tests systems and recommends alternative designs based on feedback.
Level 4	Makes recommendations for improving the overall system or the relationship between its components. Designs new components.
Level 3	Implements improvements and evaluates their effectiveness.
Level 2	Evaluates options and makes a recommendation for modifying and improving a major component or part in an existing system.
Level 1	Identifies a need for improvement in a major component or part of a system.

SCANS—O*NET Crosswalk:

Comments: No equivalent. This competency is organized differently in SCANS and O*NET. SCANS categorized their "system" skills into three competencies. O*NET categorized their "system" skills into six competencies. There is also crossover to O*NET technology skills. Some O*NET's skills could be interpreted as covering SCANS "improves and designs systems," but this fit would be incomplete. Although it is recognized that there is a relationship, there is no equivalence.

Other O*NET Links:

The O*NET framework contains other references to improving and designing systems. These include:

Operation analysis (Worker Requirements): Identifies the requirements for a new technology including user needs, products requirements, and production, or operating, requirements for a system, tool, or type of technology.

Drafting, lay-out and specifying technical devices, parts, and equipment (Occupational Requirements): Providing documentation, detailed instruction, drawings, or specifications to inform others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.

Assessments:

Industrial Psychology International, Ltd. -- Judgement

Industrial Psychology International, Ltd. (IPI)
4106 Fieldstone Road
Champaign, IL 61822
(217)398-1437
(800)747-1119

Allocates time

Allocates money

Allocates material and facility resources

Allocates human resources

Acquires and evaluates information

Organizes and maintains information

Interprets and communicates information

Uses computers to process information

Teaches others

Exercises leadership

Negotiates to arrive at a decision

Understands systems

Monitors and corrects performance

Improves and designs systems

Selects technology

Applies technology to task

Creative thinking

Problem solving

Seeing things in the mind's eye

Reasoning

Industrial Psychology International, Ltd. -- Numerical Proficiency Assessment (NPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Understands systems Monitors and corrects performance **Improves and designs systems** Selects technology Applies technology to task Maintains and troubleshoots technology Mathematics
Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance **Improves and designs systems** Selects technology Applies technology to task Creative thinking

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance **Improves and designs systems** Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Technology

Selects Technology

SCANS Definition: Judges which set of procedures, tools, or machines, including computers and their programs, will produce the desired results.

Demonstrating competence in selecting technology includes determining desired outcomes and applicable constraints; visualizing the necessary methods and applicable technology; evaluating specifications; and judging which machine or tool will produce the desired results.

Panel Comments: Selects Technology and Applies Technology should be combined into one competency.

Summary of Literature Review: Seven sources, listed below, were found to include some aspect of the competency "selects technology" in their definition of necessary workplace skills. In general, these sources support the SCANS definition for selecting technology. However, several sources include the behaviors of learning about new technology, identifying and defining technology, and transferring technology to new situations. They also include the ideas of maximizing use with social, ethical, and environmental responsibility, and selecting appropriate technology.

List of Sources:

Consensus Framework for Workplace Readiness	Technology: Learns about current and emerging technologies.
Equipped for the Future	Decision-making skills: Identify and access the technology needed to solve problems and make decisions.
Future Work	Specialty skills: Technology-transfer skills.
Mexico's Occupational Analysis Study	Use of Technology: [Level 5] Study, analyze, compare and evaluate different technological products, develop and design new technological systems. [Level 4] Analyze working operations that require the use of technology. [Level 3] Install, monitor, inspect, and diagnose problems in a technological system. [Level 2] Select, prepare, adjust, and maintain equipment. [Level 1] Use tools and measuring instruments to obtain basic information on a piece of equipment.
New Standards Project	Using technology: Defines the purpose and objectives for the use of technology; and transfers technological principles to a new situation; and selects technological practices to maximize socially and ethically responsible use of technology.

Skill Demand, Changing Work Organization, and Performance

Workplace competencies: Selects appropriate equipment and tools.

Washington Workplace Competency Worksheet

Technology: Displays a basic level of competence in selecting and using technology, visualizes operations.

SCANS Scales:

SCANS Scale Rationale:

Greater scope of tasks and degree of influence

↑

Lesser scope of tasks and degree of influence

Level 5	Conducts needs analyses and develops specifications for new technology based on the current project, desired outcome, costs, and personnel.
Level 4	Identifies and learns about innovations in technology to select technology that meets current and future requirements for several projects in the work area.
Level 3	Evaluates project specifications and determines which machines/tools will produce the desired results.
Level 2	Evaluates similar tools and machinery to select the best one(s) for a specific task.
Level 1	Selects the appropriate basic tools or simple machinery as directed based on instructions for a specific task.

SCANS—O*NET Crosswalk:

Comments: No equivalent. This competency is organized differently in SCANS and O*NET. SCANS categorized their "technology" skills into three competencies. O*NET categorized their "technology" skills into twelve competencies. There is also crossover to O*NET system skills. Some O*NET's skills could be interpreted as covering SCANS "selects technology," but this fit would be incomplete. Although it is recognized that there is a relationship, there is no equivalence.

Other O*NET Links:

The O*NET framework contains other references to selecting technology. These include:

Operation analysis (Worker Requirements): Identifies the requirements for a new technology including user needs, product requirements, and production, or operating, requirements for a system, tool, or type of technology.

Equipment selection (Worker Requirements): Identifies the kind of technology, equipment or tool available most likely to satisfy user requirements in a cost-effective fashion.

Assessments:

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems **Selects technology** Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Numerical Proficiency Assessment (NPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Understands systems Monitors and corrects performance Improves and designs systems **Selects technology** Applies technology to task Maintains and troubleshoots technology Mathematics

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems **Selects technology** Applies technology to task Creative thinking

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems **Selects technology** Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

WORKPLACE COMPETENCIES: Technology

Applies Technology to Task

SCANS Definition:	Understands the overall intent and the proper procedures for setting up and operating machines, including computers and their programming systems. Demonstrating competence in how to apply technology to task includes understanding how different parts of machines interact and how machines interact with broader production systems; on occasion installing machines including computers; setting up machines or systems of machines efficiently to get desired results; accurately interpreting machine output; and detecting errors from program output.
Panel Comments:	Selects Technology and Applies Technology should be combined into one competency.
Summary of Literature Review:	Fourteen sources, listed below, were found to include some aspect of the competency "applies technology to task" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for applying technology to task. However, several sources mention assembling, constructing, repairing, and safeguarding technology, and the use of basic tools. They also include the behaviors of adapting to changing technology, using technology appropriate to a certain field, and determining the best way to get the job done. There are many cross-references with the skill of knowing how to learn, so it may be helpful to refer to that definition while refining this one.
List of Sources:	
Australia's Key Competencies	Using technology: Combines the physical and sensory skills needed to operate equipment with the understanding of scientific and technological principles needed to explore and adapt systems.
California Career-Technical Assessment Project (CTAP)	Technological literacy: Understands and adapts to changing technology, employs technology appropriate to a field, and identifies, learns, and applies new technological skills to improve job performance.
Chatham-Savannah Compact	Technology: Uses different common technologies (e.g., computer, voice mail, electronic mail).
Colorado Department of Education	Manual perceptual skills: Constructs and assembles materials, uses specific hand tools and instruments, develops visual presentations, masters keyboard skills, and operates power equipment.

Consensus Framework for Workplace Readiness	Technology: Applies technology solutions to problem situations.
Equipped for the Future	Decision-making skills: Apply existing skills and learn new skills to keep up with changing technology.
High School Curriculum Study	Among skills identified by survey results: Drives a car or truck; uses shop tools.
Mexico's Occupational Analysis Study	Use of Technology: [Level 5] Study, analyze, compare and evaluate different technological products, develop and design new technological systems. [Level 4] Analyze working operations that require the use of technology. [Level 3] Install, monitor, inspect, and diagnose problems in a technological system. [Level 2] Select, prepare, adjust, and maintain equipment. [Level 1] Use tools and measuring instruments to obtain basic information on a piece of equipment. Applied technology: [Level 5] Use a wide range of complex tools and systems, foresee the outcome when applying principles that affect the properties of a given system, understand and interpret correctly the relationships between physical systems, use suitable diagnostic equipment, interpret information, form hypotheses and test them, use other means of non-visible symptoms, and take into account resources when making a decision. [Level 4] Use complex systems, multiple tools, or systems operating at the same time or in sequence, solve problems using appropriate testing procedures that may require dismantling the system into parts, determine the best way to get the job done, and understand material properties to determine dangerous conditions. [Level 3] Know how complex tools and systems operate and how they relate to one or more systems, use simple machines and systems for a specific purpose, apply more complex principles such as electrical current and water flow, and forecast the possible outcome if two or more variables are altered. [Level 2] Know the basic operating principles of machinery and tools, use simple equipment if given instructions, use simple tools to solve basic problems. [Level 1] Identify basic components and tools, and carry out basic tasks with simple tools and machinery. Handling, storing, conservation, and manufacturing of materials and products: [Level 5] Evaluate existing systems and processes in order to develop new or improved processes and/or products. [Level 4] Diagnose problems concerning processes and the installation of equipment to manufacture products and suggest solutions. [Level 3] Manufacture, install, repair, and safeguard materials products, installations, or equipment, as well as carry out tests on products' characteristics and conditions. [Level 2] Follow specifications or instructions when channeling materials, products, equipment or machinery. [Level 1] Follow procedures or instructions in order to undertake a specific task, including physical activities such as classification, cleaning, loading, stacking, mixing, staring, and delivering materials and products.
Michigan Employability Skills	Academic skills: Uses tools and equipment.

New Standards Project	Using technology: Uses technological principles to reduce constraints presented by environs and physical capacity; and configures and manages a series of operations as a process.
New York State Education Department	Expanded basics: Demonstrates manual dexterity.
Skill Demand, Changing Work Organization, and Performance	Workplace competencies: Applies equipment and tools to task.
Washington Workplace Competency Worksheet	Technology: Uses technology to monitor tasks.
Work Keys	Understand technological principles; apply problem-solving techniques.

SCANS Scales:

SCANS Scale Rationale:

Proactive toward complex tasks
↑
Reactive toward simple tasks

Level 5	Conceptualizes and designs high-level technology. Anticipates growth and the need for new and improved technology to meet needs.
Level 4	Modifies or makes a recommendation for modifying tools and/or machines to improve efficiency and performance.
Level 3	Adjusts and calibrates machines to improve output and to detect and/or eliminate errors.
Level 2	Uses multiple tools and/or machines to accomplish more than one task. Uses different common technologies. For example, uses a computer, voice mail, and electronic mail.
Level 1	Uses a single tool or machine to complete a single task.

SCANS—O*NET Crosswalk:

Comments: No equivalent. This competency is organized differently in SCANS and O*NET. SCANS categorized their "technology" skills into three competencies. O*NET categorized their "technology" skills into twelve competencies. Some of O*NET's skills could be interpreted as covering SCANS "applies technology to task," but this fit would be incomplete. Although it is recognized that there is a relationship, there is no equivalence.

Other O*NET Links:

The O*NET framework contains other references to applying technology to task. These include:

Operation and control (Worker Requirements): Controlling operations of equipment or systems.

Installation (Worker Requirements): Installing equipment, machines, wiring, or programs to meet specifications.

Technology design (Worker Requirements): Generating or adapting equipment and technology to serve user needs.

Handling and moving objects (Occupational Requirements): Using one's own hands and arms in handling, installing, forming, positioning, and moving materials, or in manipulating things, including the use of keyboards.

Controlling machines and processes (Occupational Requirements): Using either control mechanisms or direct physical activity to operate machines or processes (Not including computers or vehicles).

Interacting with computers (Occupational Requirements): Controlling computer functions by using programs, setting up functions, writing software, or otherwise communicating with computer systems.

Operating vehicles, mechanized devices, or equipment (Occupational Requirements): Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.

Implementing ideas, programs, systems, or products (Occupational Requirements): Conducting or carrying out work procedures and activities in accord with one's own ideas or information provided through directions/instructions for purposes of installing, modifying, preparing, delivering, constructing, integrating, finishing, or completing programs, systems, structures, or products.

Repairing and maintaining mechanical equipment (Occupational Requirements): Fixing, servicing, aligning, setting up, adjusting, and testing, machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

Repairing and maintaining electronic equipment (Occupational Requirements): Fixing, servicing, adjusting, regulating, calibrating, fine-tuning, or testing, machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.

Assessments:

Industrial Psychology International, Ltd.-- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology **Applies technology to task** Creative thinking Problem solving Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Numerical Proficiency Assessment (NPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Understands systems Monitors and corrects performance Improves and designs systems Selects technology **Applies technology to task** Maintains and troubleshoots technology Mathematics

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology **Applies technology to task** Creative thinking

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision **Applies technology to task** Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology **Applies technology to task** Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning

Maintains and Troubleshoots Technology

SCANS Definition: Prevents, identifies, or solves problems in machines, computers, and other technologies. Demonstrating competence in maintaining and troubleshooting technology includes identifying, understanding, and performing routine preventative maintenance and service on technology; detecting more serious problems; generating workable solutions to correct deviations; and recognizing when to get additional help.

Panel Comments: None.

Summary of Literature Review: Four sources, listed below, were found to include some aspect of the competency "maintains and troubleshoots technology" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for maintaining and troubleshooting technology.

List of Sources:

Chatham-Savannah Compact	Technology: Specifies and conducts troubleshooting steps in appropriate sequence.
Consensus Framework for Workplace Readiness	Technology: Applies thinking/problem-solving skills to technology situations; evaluates and improves technology.
Mexico's Occupational Analysis Study	Use of Technology: [Level 5] Study, analyze, compare and evaluate different technological products, develop and design new technological systems. [Level 4] Analyze working operations that require the use of technology. [Level 3] Install, monitor, inspect, and diagnose problems in a technological system. [Level 2] Select, prepare, adjust, and maintain equipment. [Level 1] Use tools and measuring instruments to obtain basic information on a piece of equipment. Applied technology: [Level 5] Use a wide range of complex tools and systems, foresee the outcome when applying principles that affect the properties of a given system, understand and interpret correctly the relationships between physical systems, use suitable diagnostic equipment, interpret information, form hypotheses and test them, use other means of non-visible symptoms, and take into account resources when making a decision. [Level 4] Use complex systems, multiple tools, or systems operating at the same time or in sequence, solve problems using appropriate testing procedures that may require dismantling the system into parts, determine the best way to get the job done, and understand material properties to determine dangerous conditions. [Level 3] Know how complex tools and systems operate and how they relate to one or more systems, use simple machines and systems for a specific purpose, apply more complex principles such as electrical current and water flow, and forecast the possible outcome if two or more variables are altered. [Level 2] Know the basic operating principles of machinery and tools, use simple equipment if given instructions, use simple tools to solve basic problems. [Level 1] Identify basic components and tools, and carry out basic tasks with simple tools and machinery.

Mexico's Occupational Analysis Study (Continued)

Handling, storing, conservation, and manufacturing of materials and products: [Level 5] Evaluate existing systems and processes in order to develop new or improved processes and/or products. [Level 4] Diagnose problems concerning processes and the installation of equipment to manufacture products and suggest solutions. [Level 3] Manufacture, install, repair, and safeguard materials products, installations, or equipment, as well as carry out tests on products' characteristics and conditions. [Level 2] Follow specifications or instructions when channeling materials, products, equipment or machinery. [Level 1] Follow procedures or instructions in order to undertake a specific task, including physical activities such as classification, cleaning, loading, stacking, mixing, staring, and delivering materials and products.

Washington Workplace Competency Worksheet

Technology: Maintains troubleshooting of complex equipment; understands and handles diverse communication technologies.

SCANS Scales:

Level 5	Anticipates future problems, and develops and implements plans for preventing them. Determines major overhauls for equipment and/or supplies.
Level 4	Diagnoses problems and recommends solutions.
Level 3	Carries out repairs in correct sequence. Inspects and maintains major components. Detects defects in parts.
Level 2	Performs scheduled preventative maintenance on technology and corrects basic problems.
Level 1	Operates equipment properly and monitors for problems. Identifies obvious signs of malfunction, and notifies appropriate contact person.

SCANS Scale Rationale:

Proactive toward tasks
↑
Reactive toward tasks

SCANS—O*NET Crosswalk:

Comments: No equivalent. This competency is organized differently in SCANS and O*NET. SCANS categorized their "technology" skills into three competencies. O*NET categorized their "technology" skills into twelve competencies. Some of O*NET's skills could be interpreted as covering SCANS "maintains and troubleshoots technology," but this fit would be incomplete. Although it is recognized that there is a relationship, there is no equivalence.

Other O*NET Links:

The O*NET framework contains other references to maintaining and troubleshooting technology. These include:

Repairing (Worker Requirements): Repairing machines or systems using the needed tools.

Troubleshooting (Worker Requirements): Determining what is causing an operating error and deciding what to do about it.

Equipment maintenance (Worker Requirements): Performing routine maintenance and determining when and what kind of maintenance is needed.

Testing (Worker Requirements): Conducting tests to determine whether equipment, software, or procedures are operating as expected.

Repairing and maintaining mechanical equipment (Occupational Requirements): Fixing, servicing, aligning, setting up, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

Repairing and maintaining electronic equipment (Occupational Requirements): Fixing, servicing, aligning, setting up, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of electronic (not mechanical) principles.

Inspecting equipment, structures, or materials (Occupational Requirements): Inspecting or diagnosing equipment, structures, or materials to identify the causes of errors or other problems or defects.

Assessments:

Industrial Psychology International, Ltd.-- Numerical Proficiency Assessment (NPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task **Maintains and troubleshoots technology** Mathematics

FOUNDATION SKILLS: Basic Skills

Reading

SCANS Definition:

Locates, understands, and interprets written information in prose and documents—including manuals, graphs, and schedules—to perform tasks; learns from text by determining the main idea or essential message; identifies relevant details, facts and specifications; infers or locates the meaning of unknown or technical vocabulary; and judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers.

Panel Comments:

The definition describes a high level of reading; the scale should begin at a more basic level.

The types of documents used in examples should include both school materials and work documents.

Additions to the definition should include: reading to do, reading to learn, and reading job-specific symbols and words.

Summary of Literature Review:

Thirty-two sources, listed below, were found to include some aspect of the skill "reading" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition for reading. However, several sources mention the following behaviors: interpreting quantitative information; decoding; using the features of documents (e.g., table of contents, index); using reference manuals; using contextual clues; separating fact from propaganda; recognizing biases information; evaluating the worth and objectivity of sources; recognizing inconsistencies; and judging the validity of evidence. There are many cross-references to acquiring and evaluating information, so it may be helpful to refer to that definition while refining this one.

List of Sources:

Assessing Literacy in the Workplace

Basic skills: Demonstrates reading ability.

AON Consulting Survey of Human Resource Trends

Among skills identified by human resource professionals: Demonstrates reading ability.

Basic Skill Requirements for Selected Army Occupational Training Courses

Reading: Recognizing familiar civilian words in written context; Reading for and understanding main ideas; Reading for and understanding details.

Basic Skills in the U.S. Work Force	Among skills identified by survey results: Identifies and comprehends the main and subordinate ideas in a written work and summarizes ideas in own words; recognizes different purposes and methods of writing, identifies a writer's point of view and tone, and interprets a writer's meaning inferentially as well as literally; varies reading speed and method according to the type of material and the purpose for reading; uses the features of printed materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, bibliography; defines unfamiliar words by decoding, using contextual clues, or using a dictionary.
Bottom Line: Basic Skills in the Workplace	Among skills identified by small and medium-sized firms: Demonstrates reading skills.
Chamber of Commerce and National Association of Manufacturers' Survey	Among skills identified by surveyed employers: General academics (assumed to include reading).
Colorado Department of Education	Reading skills: Understands the importance of reading in jobs; develops vocabulary related to work tasks; reads for details and special information; interprets pictures, graphs, and symbols; locates information in reference materials; follows intent of written directions/instructions; interprets ideas and concepts (comprehension); and reads accurately at appropriate rate.
Equipped for the Future	Communication skills: Use decoding and pre-reading strategies to comprehend and interpret text. Distinguish fact from opinion, understand different text perspectives, and compare personal knowledge and experience to other information sources. Gather and analyze information presented visually. Evaluate and critique the visual material for content, purpose and use. Consider what is not shown as well as what is shown.
Fort Worth: Project C^3	Ability to search for specific information or interrelated ideas, understand main theme or point, make generalizations (e.g., proofreading to delete errors, etc.).
Framework for Developing Skill Standards for Workplace Literacy	Reading comprehension: Decodes, interprets, and comprehends information drawn from written documents, etc.; recognizes technical vocabulary used at the workplace, including abbreviations; follows written directions; locates information; scans materials for specific facts; reads for details.
High School Curriculum Study	Among skills identified by survey results: Demonstrates reading ability.
High Schools and the Changing Workplace: The Employer's View	Reading: Understands the purpose of written material, noting details and facts; identifies and summarizes principal and subsidiary ideas; identifies inconsistency in written materials, verifies information and evaluates the worth and objectivity of sources, interprets quantitative information (e.g., tables, charts, and graphs).

Job Skills for the 21st Century	Basic skills: Reading.
Kansas Business Survey	Comprehension/understanding.
Kansas Competency Index of Workplace Skills	Basic language arts skills: Reads.
Kentucky Council on School Performance Standards	Reading: Reads for pleasure and information, adjusts reading speed and method to type of material and purpose, and recognizes different purposes and styles of writing; understands the most important information in the text of a newspaper, technical report, narrative, magazine, etc., reads critically by separating fact from opinion or propaganda, recognizing stereotypes and bias, recognizing inconsistencies, and judging the validity of evidence; defines unfamiliar words by decoding, using contextual clues, and using a dictionary or thesaurus; and applies specific strategies to assist with problems of comprehension in reading.
Mexico's Occupational Analysis Study	Reading materials for information: [Level 5] Read complex documents and compositions to analyze, evaluate, and solve problems and make decisions. [Level 4] Read complex, routine documents to coordinate work activities, to inform others and make decisions. [Level 3] Read various materials to obtain information to determine work to be carried out or how to repair machinery or equipment, interpret graphs, tables, and written instructions or directions. [Level 2] Read work orders, instructions, memorandums, etc. to carry out activities correctly. [Level 1] Read very simple materials to carry out activities correctly. Reading: [Level 5] Make generalizations beyond those of the given information so as to indicate the rationale as well as the implicit details. [Level 4] Use the context to grasp the meaning or words and apply information in situations that are not specifically described. [Level 3] Interpret explicit procedures and policies, understand the meaning of words that indicate order, position, time and other factors, find details and information in longer texts or obscured by complex sentences, combine information from different parts of the text, and outline steps to be taken in following procedures. [Level 2] Understand the main idea in a simple text, identify concrete information needed to complete a task, and identify the correct definition of a word used in a body of text. [Level 1] Recognize simple, commonly used words that are in daily life or that are essential for the job, and recognize basic personal information.
Michigan Employability Skills	Academic skills: Reads and understands written materials.
New Standards Project	Comprehensive standards for English Language Arts, which include reading.

New York State Education Department	Language arts skills: Reads for aesthetic and personal response, acquisition, interpretation, application, critical analysis, and evaluation.
*O*NET*	Reading comprehension: Understanding written sentences and paragraphs in work-related documents.
Skill Demand, Changing Work Organization, and Performance	Foundation skills: Demonstrates basic reading ability.
Survey of Employers in Los Angeles and Torrance, California	Among attributes valued by surveyed employers: Education (assumed to include reading).
Survey of San Francisco Employers	Among desirable characteristics identified by employers: Has a good reading ability.
Teaching the New Basic Skills	Among six time-of-hire skills: Reads at the ninth-grade level or higher.
Training America: Strategies for the Nation	Among skills identified by employers: Demonstrates knowledge of basic skills (assumed to include reading).
Washington Workplace Competency Worksheet	Locates, understands, and interprets information written in English prose and contained in technical documents (manuals, graphs, and schedules), determines the main idea in text, identifies relevant facts, details, and specifications, recognizes biased information, evaluates the accuracy, appropriateness, style, and plausibility of reports, proposals, and theories of other writers, and thinks convergently and divergently.
Work Keys	Choose main ideas or details, understand word meanings, apply instructions, apply information and reasoning.
Workforce Development Region IX Needs Assessment Survey Report	Among skills identified by businesses surveyed: Demonstrates reading ability.

Workforce LA Basic skills: Demonstrates reading ability.

Workplace Basics (Carnevale) Workers must read to locate information, and must analyze and monitor own reading level.

Young People's Participation in Post-Compulsory Education and Training Language and communication: Demonstrates reading ability.

SCANS Scales:

	Level 5	Synthesizes specialized or highly technical documents in order to solve problems or perform analysis or evaluation.
SCANS Scale Rationale:	Level 4	Simplifies and translates information from a complex document.
Greater complexity of content	Level 3	Reads work-related documents such as technical manuals, budgeting reports, blueprints, schematics, and school-related documents such as textbooks and newspapers. Comprehends and identifies trends, patterns, or themes in information.
↑	Level 2	Reads materials such as maps, work orders, sets of instructions, and memoranda needed to complete a task.
Basic or routine content	Level 1	Reads simple material such as basic instructions, directories, product labels, menus, phone messages, and signs to be informed or to learn.

SCANS—O*NET Crosswalk: O*NET Reading Comprehension: (Technical Definition) Decodes, interprets, and comprehends information drawn from written documents, books, etc. (Operational Definition) Understanding written sentences and paragraphs in work-related documents.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Scale Rationale:

Greater complexity of content

↑

Basic or routine content

SCANS Reading			*O*NET Reading Comprehension*	
Level 5	Synthesizes specialized or highly technical documents in order to solve problems or perform analysis or evaluation.	➡	High	Reading a scientific journal article describing surgical procedures.
Level 4	Simplifies and translates information from a complex document.			
Level 3	Reads work-related documents such as technical manuals, budgeting reports, blueprints, schematics, and school-related documents such as textbooks and newspapers. Comprehends and identifies trends, patterns, or themes in information.			
Level 2	Reads materials such as maps, work orders, sets of instructions, and memoranda needed to complete a task.	➡	Medium	Reading a memo from management describing new personnel policies.
Level 1	Reads simple material such as basic instructions, directories, product labels, menus, phone messages, and signs to be informed or to learn.	➡	Low	Reading step-by-step instructions for completing a form.

Other O*NET Links: The O*NET framework contains other references to reading. These include:

Written Comprehension (Worker Characteristics): The ability to read and understand information and ideas presented in writing.

Assessments:

Adult Basic Learning Examination, Second Edition (ABLE) 1986	Harcourt Brace Educational Measurement 555 Academic Court San Antonio, TX 78204-2498 (800)211-8378	**Reading** Arithmetic/Mathematics
Basic Achievement Skills Individual Screener (BASIS) 1983	Harcourt Brace Educational Measurement 555 Academic Court San Antonio, TX 78204-2498 (800)211-8378	**Reading** Writing Mathematics
Basic Skills Tests	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	**Reading** Writing Arithmetic/Mathematics Listening Decision making Problem solving Reasoning
Comprehensive Adult Student Assessment System (CASAS)	CASAS 8910 Clairemont Mesa Blvd. San Diego, CA 92123-1104 (619)292-2900 (800)255-1036	**Reading** Writing Mathematics Listening Speaking Problem solving
Employee Aptitude Survey (EAS)	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	**Reading** Arithmetic/Mathematics Creative thinking Problem solving Seeing things in the mind's eye Reasoning
Flanagan Aptitude Classification Tests (FACT)	NCS Workforce Development Division 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	**Reading** Writing Arithmetic Seeing things in the mind's eye Reasoning

Flanagan Industrial Tests (FIT)	NCS Workforce Development Division 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Allocates time **Reading** Arithmetic/Mathematics Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Reading Comprehension	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-111	**Reading**
Professional Employment Test	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	**Reading** Arithmetic/Mathematics Problem solving Reasoning
SRA® Reading-Arithmetic Index (RAI™)	NCS Workforce Development Division 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	**Reading** Arithmetic
TABE (Test of Adult Basic Education) 7&8 Complete Battery	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information **Reading** Writing Arithmetic/Mathematics Creative thinking Problem solving Reasoning
TABE (Test of Adult Basic Education) 7&8 Survey	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information **Reading** Writing Arithmetic/Mathematics Creative thinking Problem solving Reasoning

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task **Reading** Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning
Wonderlic Basic Skills Test	Wonderlic, Inc. 1795 N. Butterfield Road Libertyville, IL 60048-1238 (800)963-7542	**Reading** Arithmetic/Mathematics
Work Keys Locating Information	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	**Reading** Decision making Reasoning
Work Keys Reading for Information	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	**Reading**

FOUNDATION SKILLS: Basic Skills

Writing

SCANS Definition: Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately; composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, flow-charts; uses language, style, organization, and format appropriate to the subject matter, purpose, and audience; includes supporting documentation and attends to level of detail; and checks, edits, and revises for correct information, appropriate emphasis, form, grammar, spelling, and punctuation.

Panel Comments: None.

Summary of Literature Review: Thirty-five sources, listed below, were found to include some aspect of the skill "writing" as part of their definition of necessaey workplace skills. In general, these sources support the SCANS definition for writing. However, several sources also include organizing, selecting, and relating ideas; writing outlines; taking notes; using reference books; and using primary and secondary sources. They mention the need to write clearly and concisely for different purposes. For handwritten material, legibility is important.

List of Sources:

AON Consulting Survey of Human Resource Trends	Among skills identified by human resource professionals: Demonstrates writing ability.
Arizona Workplace Skills Standards (Draft)	Use principles of effective oral, written, and listening communication skills to make decisions and solve workplace problems, which includes writing formal communications that have a definite audience and clear purpose; contain no gaps, omissions or assumptions which impede comprehension; following the proper form whether it be a personal or business letter, message, memo, manual directions or applications; and demonstrating correct grammar and punctuation in writing.
Assessing Literacy in the Workplace	Basic skills: Demonstrates writing ability.
Australia's Key Competencies	Communicating ideas and information: Communicates using the range of written, graphic, and other non-verbal means of expression.
Basic Skill Requirements for Selected Army Occupational Training Courses	Writing: Writing legibly; being able to spell; being able to write grammatically; knowing how to punctuate; proofreading; writing understandable statements or sentences.

Basic Skills in the U.S. Workforce	Among skills identified by survey results: Organizes, selects, and relates ideas and outlines and develops them in coherent paragraphs; writes standard English sentences with correct sentence structure; verb form; punctuation, capitalization, possessives, plural forms, and other matters of mechanics; word choice and spelling; gathers information from primary and secondary sources; writes a report using this research; quotes, paraphrases, and summarizes accurately; and cites sources properly.
Bottom Line: Basic Skills in the Workplace	Among skills identified by small and medium-sized firms: Demonstrates writing skills.
Chamber of Commerce and National Association of Manufacturers' Survey	Among skills identified by surveyed employers: General academics (assumed to include writing).
Colorado Department of Education	Writing skills: Understands the importance of writing in jobs; applies basic writing principles; uses reference materials; develops handwriting legibility; composes formal letters; fills out forms; records messages; writes memorandums; composes an ad; writes instructions and directions; writes reports; develops summaries; takes notes and/or outlines; and corrects written materials.
Employer's Choice	Communicates effectively: Demonstrates writing skills.
Equipped for the Future	Communication skills: Convey ideas in writing; apply basic principles of composition and organization to communicate ideas and information. Use English language conventions of spelling, punctuation, grammar, and sentence and paragraph structure.
Fort Worth: Project C^3	Ability to write to inform; and express ideas accurately with correct spelling, quoting and phrasing (e.g., to construct letters and reports, to write a business letter to relate actions taken at a meeting.
Framework for Developing Skill Standards for Workplace Literacy	Communicates thoughts, ideas, information, and messages in writing; planning, generating, and revising text. Write short notes and simple memos. Enter or transfer information onto a form. Creates flowchart prose information. Take telephone messages accurately.
Future Work	Positive skills or attributes: Writing.
Getting a Job after College	Functional skills: Demonstrates writing skills.
High School Curriculum Study	Among skills identified by survey results: Demonstrates writing ability.

High Schools and the Changing Workplace: The Employer's View	Writing: Gathers information suitable for the purpose, organizes information in a logical and coherent manner, uses Standard English syntax, applies the rules of correct spelling, punctuation, and capitalization, uses reference books such as a dictionary, thesaurus, and an encyclopedia, writes legibly.
Job Skills for the 21st Century	Basic skills: Writing.
Mexico's Occupational Analysis Study	Writing: [Level 5] Draft original written works (e.g., articles, technical reports, books, etc.) using correct grammar, spelling, and professional language suitable to the context. [Level 4] Use complex sentences and join ideas in a logical sequence so as to transmit information in work-related documents such as reports, manuals, and summaries. [Level 3] Write simple text with words commonly used on the job, convey ideas, and follow the rules of grammar and spelling to produce workplace documents such as minutes, memorandums, and letters. [Level 2] Write complete sentences with commonly used word and correct punctuation to relate messages in simple phrases. [Level 1] Communicate in writing using simple sentences or lists of words; write basic personal information or information pertaining to their job. Communication: [Level 5] Write and create presentations that inform, persuade or introduce new ideas or make proposals, draft technical reports or other specialized materials, including the translation of materials to other languages with accuracy. [Level 4] Present information on how to carry out work operations, write manuals for a system, draw graphs and tables according to specifications, design programs for use in education and training. [Level 3] Draft instructions on procedures, prepare tables and graphs to show information collected form different sources, use a second language for conveying instructions to others for carrying out an activity. [Level 2] Record events, write basic correspondences memorandums and e-mail messages so as to keep clients, suppliers and co-workers informed. [Level 1] Copying and recording information, such as keeping inventory or preparing a client list.
Michigan Employability Skills	Academic skills: Writes in the language in which business is conducted.
New Standards Project	Separate standards for English Language Arts, which include writing.
New York State Education Department	Language arts skills: Writes for personal expression, social interaction, information and understanding, critical analysis and evaluation.
*O*NET*	Written expression: The ability to communicate information and ideas in writing so others will understand. Writing: Communicating effectively with others in writing as indicated by the needs of the audience.

PLATO Learning System	Writing in the workplace.
Skill Demand, Changing Work Organization, and Performance	Communication skills: Demonstrates writing ability.
Survey of Employers in Los Angeles and Torrance, California	Among attributes valued by surveyed employers: Education (assumed to include writing).
Training America: Strategies for the Nation	Among skills identified by employers: Demonstrates knowledge of basic skills (assumed to include writing).
Vocational-Technical Consortium of States (VTECS)/Illinois	Communicating on the job: Writes legibly, prepares written communications.
Washington Basic Skills	Filling out forms and documents: Completes job applications, telephone message forms, order forms, employment forms, and education and training applications.
Washington Workplace Competency Worksheet	Writing: Communicates thoughts, ideas, information, and messages in writing, writes or types legibly and clearly, records information completely and accurately, composes and creates documents such as letters, directions, and reports, creates graphs and flowcharts, uses language, style, organization, and format that are appropriate to the subject matter, purpose, audience, etc., and edits, revises, and corrects information.
Work Keys	Writing skills, including grammar, punctuation and spelling, organization, style.
Workforce Development Region IX Needs Assessment Survey Report	Among skills identified by businesses surveyed: Demonstrates writing ability.
Workforce LA	Basic skills: Demonstrates writing ability.

Workplace Basics (Carnevale)	Writing in the work context also demands creativity, analysis, conceptualization, and the ability to articulate ideas clearly in written format.
Young People's Participation in Post-Compulsory Education and Training	Language and communication: Demonstrates writing ability.

SCANS Scales:

	Level 5	Creates documents, articles, and/or books involving complex subject matter, synthesizing information from multiple sources. Compares contrasting information. Incorporates technical information. Creates proposals and presentations. Performs content editing on complex documents.
SCANS Scale Rationale:	Level 4	Writes reports on complex topics. Uses correct professional vocabulary and provides supporting documentation and notations.
Greater complexity of content ↑	Level 3	Composes and formats basic workplace documents such as letters, memoranda, informative reports, and school-related reports such as essays. Uses vocabulary, style, and tone that are appropriate for the audience. Copyedits others' writing.
Basic or routine content	Level 2	Records information accurately and completely. Writes standard English sentences using familiar workplace vocabulary. Communicates general meaning clearly.
	Level 1	Records or copies information using simple phrases or lists of words in order to communicate basic information pertaining to work. For example, records a personal message or fills out a simple job application or time sheet.

SCANS—O*NET Crosswalk:

O*NET Writing: (Technical Definition) Communicaties thoughts, ideas, information, and messages in writing; planning, generating, and revising text. (Operational Definition) Communicating effectively with others in writing as indicated by the needs of the audience.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Writing			*O*NET Writing*	
Level 5	Creates documents, articles, and/or books involving complex subject matter, synthesizing information from multiple sources. Compares contrasting information. Incorporates technical information. Creates proposals and presentations. Performs content editing on complex documents.	➡	High	Writing a novel for publication.
Level 4	Writes reports on complex topics. Uses correct professional vocabulary and provides supporting documentation and notations.			
Level 3	Composes and formats basic workplace documents such as letters, memoranda, informative reports, and school-related reports such as essays. Uses vocabulary, style, and tone that are appropriate for the audience. Copyedits others' writing.	➡	Medium	Writing a memo to staff outlining new directives.
Level 2	Records information accurately and completely. Writes standard English sentences using familiar workplace vocabulary. Communicates general meaning clearly.			
Level 1	Records or copies information using simple phrases or lists of words in order to communicate basic information pertaining to work. For example, records a personal message or fills out a simple job application or time sheet.	➡	Low	Taking a telephone message.

SCANS Scale Rationale:

Greater complexity of content
↑
Basic or routine content

Other O*NET Links:

The O*NET framework contains other references to writing. These include:

Written Expression (Worker Characteristics): The ability to communicate information and ideas in writing so others will understand.

Assessments:

Basic Achievement Skills Individual Screener (BASIS) 1983	Harcourt Brace Educational Measurement 555 Academic Court San Antonio, TX 78204-2498 (800)211-8378	Reading **Writing** Mathematics
Basic Skills Tests	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading **Writing** Arithmetic/Mathematics Listening Decision making Problem solving Reasoning
Comprehensive Ability Battery (CAB)	Institute for Personality and Ability Testing, Inc. (IPAT) P.O. Box 1188 Champaign, IL 61824-1188 (800)225-IPAT	**Writing** Arithmetic/Mathematics Reasoning
Comprehensive Adult Student Assessment System (CASAS)	CASAS 8910 Clairemont Mesa Blvd. San Diego, CA 92123-1104 (619)292-2900 (800)255-1036	Reading **Writing** Mathematics Listening Speaking Problem solving
Differential Aptitude Tests® Fifth Edition (DAT®) 1990	Harcourt Brace Educational Measurement 555 Academic Court San Antonio, TX 78204-2498 (800)211-8378	**Writing** Reasoning
Flanagan Aptitude Classification Tests (FACT)	NCS Workforce Development Division 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Reading **Writing** Arithmetic Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task **Writing** Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

TABE (Test of Adult Basic Education) 7&8 Complete Battery	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading **Writing** Arithmetic/Mathematics Creative thinking Problem solving Reasoning
TABE (Test of Adult Basic Education) 7&8 Survey	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading **Writing** Arithmetic/Mathematics Creative thinking Problem solving Reasoning
TABE Work-Related Foundation Skills (TABE-WF)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading **Writing** Arithmetic/Mathematics Creative thinking Problem solving Reasoning

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading **Writing** Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning
Work Keys Listening & Writing: Listening	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	**Writing** Listening
Work Keys Listening & Writing: Writing	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	**Writing** Listening

FOUNDATION SKILLS: Basic Skills

Arithmetic and Mathematics

SCANS Definition:

Arithmetic: Performs basic computations; uses basic numerical concepts such as whole numbers and percentages in practical situations; makes reasonable estimates of arithmetic results without a calculator; and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information.

Mathematics: Approaches practical problems by choosing appropriately from a variety of mathematical techniques; uses quantitative data to construct logical explanations for real world situations; expresses mathematical ideas and concepts orally and in writing; and understands the role of chance in the occurrence and prediction of events.

Panel Comments:

Considering these skill areas' close relationship, only one scale is needed.

Summary of Literature Review:

Forty-one sources, listed below, were found to include some aspect of the skills "arithmetic" and "mathematics" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for arithmetic and mathematics; however, most sources do not differentiate between the two. In addition, they include the behaviors of estimating, approximating, measuring, and telling time. They also mention understanding and using concepts of probability and statistics and selecting and using appropriate techniques (e.g., mental, paper and pencil, technology). Many sources also included concrete work-related examples of math application, such as budgets, pricing, etc.

List of Sources:

Arizona Workplace Skills Standards (Draft)	Students apply computation skills and data analysis techniques to make decisions and solve workplace problems, which include at the Proficiency level selecting and using appropriate computation techniques (i.e., mental, paper, pencil and technology) to solve problems and determine reasonableness of results.
Assessing Literacy in the Workplace	Basic skills: Demonstrates computation skills.
ASTD Update: Basic Skills	Individual competence skills: Demonstrates computation skills.
Australia's Key Competencies	Using mathematical ideas and techniques: Uses mathematical ideas, such as number and space, and techniques, such as estimation and approximation, for practical purposes.

Basic Skill Requirements for Selected Army Occupational Training Courses	Math: Reading and understanding schematics, diagrams. Relating schematic or diagram to real situation; Breaking down a number into 1's, 10's, 100's, and 1000's. Adding and subtracting whole numbers. Multiplying and dividing whole numbers. Understanding what a fraction is. Understanding what a decimal is. Selecting appropriate arithmetic operation for the task. Using simple formulas. Selecting appropriate formula for the task. Reading common scales like ruler or thermometer. Selecting appropriate arithmetic operation for the task. Using simple formulas. Selecting appropriate formula for the task.
Basic Skills in the U.S. Work Force	Among skills identified by survey results: Performs the computations of addition, subtraction, multiplication, division using natural numbers, fractions, decimals, and integers; makes and uses measurements in both traditional and metric units; uses effectively the mathematics of integers, fractions, and decimals, ratios, proportions, and percentages, roots, powers, algebra, and geometry; makes estimates and approximations, and judges the reasonableness of a result.
Bottom Line: Basic Skills in the Workplace	Among skills identified by small and medium-sized firms: Demonstrates computation skills.
Chamber of Commerce and National Association of Manufacturers' Survey	Among skills identified by surveyed employers: General academics (assumed to include mathematics).
Chatham-Savannah Compact	Math/computation: Performs addition, subtraction, multiplication, and division of whole numbers, common and mixed fractions, decimals, and percentages; performs mathematical operations using such equipment as a calculator, cash register, business machine, and computer-operated equipment; determines estimates, rounds off numbers, computes averages, and performs basic measurement tasks to determine length, width, height; determines ratios, interprets ratios and proportion; and converts U.S. Standard to International Metric System of measurement and vice-versa.
Colorado Department of Education	Math skills: Understands importance of math in jobs; performs arithmetic calculations; uses values from graphs, maps, and tables; uses English/metric measurements; compares numerical values; applies geometric principles; uses formulas correctly; constructs diagrams, tables, and records; uses elementary statistics; uses instruments to solve problems; and uses mathematics in solving problems.
Consensus Framework for Workplace Readiness	Academic foundations: Mathematics.
Equipped for the Future	Decision-making skills: Perform basic math computations. Use tools such as charts, graphs, tables, spreadsheets, estimation, statistics, and measurement to analyze data for sound decision-making.
Fort Worth: Project C^3	Ability to use algebra and geometry concepts to solve practical problems (e.g., calculate the number of yards of material needed for a pattern, calculate arrival times in transportation).

Framework for Developing Skill Standards for Workplace Literacy	Quantitative: Understands basic mathematical computations and problem-solving procedures and how these procedures might be used to address various problems; performs addition, subtraction, multiplication, and division including whole numbers and multiple operations, common or mixed fractions, decimals, and percentages; converts decimals, fractions, and percents; interprets ratio and proportion; converts numbers to and from the metric system; interprets data from graphs and tables; measures with a ruler and uses measurements in solving problems such as finding area.
Future Work	Positive skills or attributes: Computation.
Getting a Job after College	Functional skills: Demonstrates mathematics skills.
High Schools and the Changing Workplace: The Employer's View	Computation: Adds, subtracts, multiplies, and divides whole numbers, decimals, fractions; calculates distance, weight, area, volume, and time, converting from one measurement system to another (e.g., English to metric and vice-versa); calculates simple interest, costs, and making change; understands simple productivity and statistics; calculates information obtained from charts, graphs, and tables; uses ratios, proportions, percentages, and algebraic equations with a single unknown; estimates results; and judges their accuracy.
Kansas Business Survey	Among skills identified by surveyed businesses: Computation skills.
Kansas Competency Index of Workplace Skills	Basic mathematical skills: Demonstrates ability to add, subtract, multiply, and divide whole numbers, decimals, and fractions; solves word problems by selecting and using correct order of operations.
Kentucky Council on School Performance Standards	Math skills: Adds, subtracts, multiplies, and divides using whole numbers, decimals, fractions, and integers; performs measurement of length, area, volume, weight, and temperature; uses ratios and proportions, percents, and roots; and uses a calculator to solve math-related problems; uses spatial relationships and basic concepts of geometry; makes estimates and approximations and judges the reasonableness of the results; understands and uses concepts of probability and statistics; organizes data into tables, charts, and graphs, and interprets data presented in these forms; and uses a calculator to solve math-related problems.

Mexico's Occupational Analysis Study	Quantitative operations: [Level 5] Use mathematical models to evaluate information for the purpose of calculating the value of products and services in the market and to aid the organizational planning and technical development of products and services. [Level 4] Conduct detailed quantitative and statistical analysis of financial allocation and resource information within an organization to make decisions about operations, personnel, products, and services. [Level 3] Use mathematical formulas to prepare budgets, resolve work problems or assign resources and calculate costs of materials, supplies and services. [Level 2] Use numbers, fractions, and percentages to keep accounts, prepare invoices, statements and receipts and keep inventory, and weigh and measure items. [Level 1] Use counting, addition, subtraction, multiplying, and division to put information in order or keep track of money. Mathematics: [Level 5] Solve problems which entail four or more steps, decide which information is necessary for solution or if the information is incomplete or implicit, calculate indices such as production or price indexes, work with dimensional figures where the calculation requires dividing the figure in several regular figures to apply the correct formula, and detect errors in multiple-step calculations. [Level 4] Eliminate unnecessary information to solve a problem, use set of formulas for the conversion of weights and measures, make calculations using different units, and select the appropriate information to perform two separate calculations and then compare the results. [Level 3] Analyze information so as to determine what is necessary to solve the problem, what type of operations are needed and the sequence of steps to be followed, use averages in relation to sales, production, salaries, costs, and other data, and use proportions and ratios as models to solve problems. [Level 2] Solve simple problems that require only one mathematical operation, deal with quantities and decision-making by means of the information from cash registers, catalog prices and inventories. [Level 1] Use basic numbers to solve a problem, recognize quantities, compare similar numbers and place numbers in logical order, and perform simple addition and subtraction.
Michigan Employability Skills	Academic skills: Understands charts and graphs; understands basic mathematics; uses mathematics to solve problems.
National Vocational Qualifications (NVQ)	Applies numbers; demonstrates numeracy.
New Standards Project	Separate standards for Mathematics. In the Applied Learning framework, Mathematical Ideas and Techniques: Defines the purpose and objectives of the activity; and recognizes the assumptions which need to be made in order to apply an idea and technique; and adapts the idea and technique to fit the constraints of the situation; and makes decisions about the level of accuracy needed to resolve competing demands; and interprets and evaluates method and solutions.
New York State Education Department	Mathematics: Performs basic operations, logic, probability, statistics, measurement, and algebra/geometry.
New Zealand's Essential Skills	Numeracy skills.

*O*NET*	Number facility: The ability to add, subtract, multiply, or divide quickly and correctly. Mathematical reasoning: The ability to understand and organize a problem and then to select a mathematical method or formula to solve the problem. Mathematics: Using mathematics to solve problems.
PLATO Learning System	Applied math.
Project BEL	Among skills identified by surveyed employers: Demonstrates mathematics skills.
Quality of American High School Graduates	Among skills important to employers surveyed: Accurately adds, subtracts, multiplies, and divides; possesses basic arithmetic skills.
Skill Demand, Changing Work Organization, and Performance	Foundation skills: Demonstrates basic mathematical skills.
Survey of Employers in Los Angeles and Torrance, California	Among attributes valued by surveyed employers: Education (assumed to include mathematics).
Survey of San Francisco Employers	Among desirable characteristics identified by employers: Demonstrates an ability with numbers.
Teaching the New Basic Skills	Among six time-of-hire skills: Communicates effectively in writing; does math at the ninth-grade level or higher.
Training America: Strategies for the Nation	Among skills identified by employers: Demonstrates knowledge of basic skills (assumed to include mathematics).

Washington Basic Skills	Math computations: Adds, subtracts, multiplies, and divides whole numbers, fractions, and decimals; determines averages, makes approximations by rounding numbers, determines ratios, and judges reasonableness of numerical responses; converts fractions to decimals and vice-versa, changes percents to decimals and vice-versa, and determines percentages; demonstrates knowledge of the metric system, changes units of measure, uses measuring instruments, recognizes simple plane geometric figures and common solid geometric figures, finds perimeters, rectangular areas, and volume, determines dry and liquid measures, and tells time.
Washington Workplace Competency Worksheet	Arithmetic: Performs basic computations and uses basic numerical concepts such as whole numbers and percentages on a calculator if required, uses expressions, equations, and formulas, determines measurements, performs basic statistics and probability, solves problems, computes money (e.g., prepares a check, makes change, balances a cash drawer, and makes a bank deposit). Mathematics: Approaches practical problems by choosing appropriately from a variety of mathematical techniques, uses quantitative data to construct logical explanations for real-world situations, and expresses mathematical ideas and concepts orally and in writing.
Work Keys	Determine the number of items sold, produced, or purchased, or to figure totals on a per unit basis; work with monetary units, including figuring sales, costs, wages, and expenses; figure elapsed time, converting time units; calculate distance, area, weight, and volume; calculate commissions, discounts, taxes, price increases, changes in sales, and wage changes; and calculate averages, including sales records, wages, costs, and hours worked.
Workforce Development Region IX Needs Assessment Survey Report	Among skills identified by businesses surveyed: Demonstrates computation/math skills.
Workforce LA	Basic skills: Demonstrates ability to compute.
Young People's Participation in Post-Compulsory Education and Training	Mathematics: Demonstrates measurement skills; understands mathematical symbols; demonstrates computation skills.

SCANS Scales:

SCANS Scale Rationale:

Greater complexity of mathematical operations
↑
Basic or routine mathematical operations

Level 5	Uses calculus, probability, and/or statistics to solve workplace or organizational problems.
Level 4	Uses algebraic and/or geometric formulas or equations to solve workplace problems. Calculates measurements of complex or irregular geometric shapes.
Level 3	Converts familiar forms of fractions, decimals, or percentages from one form to another. Calculates units of measurement and perimeters and areas of basic geometric shapes. Calculates averages, simple ratios, proportions, and rates using large numbers that may contain decimals or fractions. Applies formulas to convert within or between systems of measurement. For example, converts hours to minutes or miles to kilometers.
Level 2	Uses positive and negative values. Performs multiplication and division. Uses tables, graphs, and diagrams to obtain quantitative information.
Level 1	Performs counting and simple addition and subtraction.

SCANS—O*NET Crosswalk:

O*NET Mathematics: (Technical Definition) Understands mathematical problem solving and how these procedures might be used to address various problems. (Operational Definition) Using mathematics to solve problems.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and an essence that the two are meaning to communicate the same skills

Crosswalk to O*NET Scale Anchors:

SCANS Scale Rationale:

Greater complexity of content

↑

Basic or routine content

SCANS *Arithmetic/Mathematics*			***O*NET*** *Mathematics*	
Level 5	Uses calculus, probability, and/or statistics to solve workplace or organizational problems.	➨	High	Developing a mathematical model to simulate and resolve an engineering problem.
Level 4	Uses algebraic and/or geometric formulas or equations to solve workplace problems. Calculates measurements of complex or irregular geometric shapes.			
Level 3	Converts familiar forms of fractions, decimals, or percentages from one form to another. Calculates units of measurement and perimeters and areas of basic geometric shapes. Calculates averages, simple ratios, proportions, and rates using large numbers that may contain decimals or fractions. Applies formulas to convert within or between systems of measurement. For example, converts hours to minutes or miles to kilometers.	➨	Medium	Calculating the square footage of a new home under construction.
Level 2	Uses positive and negative values. Performs multiplication and division. Uses tables, graphs, and diagrams to obtain quantitative information.			
Level 1	Performs counting and simple addition and subtraction.	➨	Low	Counting the amount of change to be given to a customer.

Other O*NET Links:

The O*NET framework contains other references to arithmetic/mathematics. These include:

Number Facility (Worker Characteristics): The ability to add, subtract, multiply, or divide quickly and correctly.

Mathematical Reasoning (Worker Characteristics): The ability to understand and organize a problem and then to select a mathematical method or formula to solve the problem.

Assessments:

Adult Basic Learning Examination, Second Edition (ABLE) 1986	Harcourt Brace Educational Measurement 555 Academic Court San Antonio, TX 78204-2498 (800)211-8378	Reading **Arithmetic/Mathematics**
Basic Achievement Skills Individual Screener (BASIS) 1983	Harcourt Brace Educational Measurement 555 Academic Court San Antonio, TX 78204-2498 (800)211-8378	Reading Writing **Mathematics**
Basic Skills Tests	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Writing **Arithmetic/Mathematics** Listening Decision making Problem solving Reasoning
Comprehensive Ability Battery (CAB)	Institute for Personality and Ability Testing, Inc. (IPAT) P.O. Box 1188 Champaign, IL 61824-1188 (800)225-IPAT	Writing **Arithmetic/Mathematics** Reasoning
Comprehensive Adult Student Assessment System (CASAS)	CASAS 8910 Clairemont Mesa Blvd. San Diego, CA 92123-1104 (619)292-2900 (800)255-1036	Reading Writing **Mathematics** Listening Speaking Problem solving
Employee Aptitude Survey (EAS)	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading **Arithmetic/Mathematics** Creative thinking Problem solving Seeing things in the mind's eye Reasoning

Flanagan Aptitude Classification Tests (FACT)	NCS Workforce Development Division 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Reading Writing **Arithmetic** Seeing things in the mind's eye Reasoning
Flanagan Industrial Tests (FIT)	NCS Workforce Development Division 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Allocates time Reading **Arithmetic/Mathematics** Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Applied Math	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Arithmetic/Mathematics**
Industrial Psychology International, Ltd. -- Numerical Proficiency Assessment (NPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Maintains and troubleshoots technology **Mathematics**
Industrial Psychology International, Ltd. -- Numbers	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Arithmetic**
Professional Employment Test	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading **Arithmetic/Mathematics** Problem solving Reasoning

SRA® Reading-Arithmetic Index (RAI™)	NCS Workforce Development Group 9701 W. Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Reading **Arithmetic**
TABE (Test of Adult Basic Education) 7&8 Complete Battery	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing **Arithmetic/Mathematics** Creative thinking Problem solving Reasoning
TABE (Test of Adult Basic Education) 7&8 Survey	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing **Arithmetic/Mathematics** Creative thinking Problem solving Reasoning
TABE Work-Related Foundation Skills (TABE-WF)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing **Arithmetic/Mathematics** Creative thinking Problem solving Reasoning

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing **Arithmetic** Creative thinking Decision making Problem solving Seeing things in the mind's eye Reasoning
Wonderlic Basic Skills Test	Wonderlic, Inc. 1795 N. Butterfield Road Libertyville, IL 60048-1238 (800)963-7542	Reading **Arithmetic/Mathematics**
Work Keys Applied Mathematics	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	**Arithmetic/Mathematics**

Listening and Speaking

SCANS Definition:

Listening: Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose (e.g., comprehend, learn, critically evaluate, appreciate, or support a speaker).

Speaking: Organizes ideas and communicates oral messages appropriate to listeners and situations; participates in conversation, discussion, and group presentations; selects an appropriate medium for conveying a message; uses verbal language and other cues such as body language appropriate in style, tone, and level of complexity to the audience and occasion; speaks clearly and communicates a message; understands and responds to listener feedback; and asks questions as necessary.

Panel Comments:

Considering the close relationship between these two skills, only one scale is needed.

Summary of Literature Review:

Forty-two sources, listed below, were found to include some aspect of the skills "listening" and "speaking" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definitions for listening and speaking. However, several sources combine these skills and refer to communication in general. They also include the behaviors of following directions, recalling and remembering information, using foreign languages, and using correct telephone techniques. According to the literature, it is important to communicate with customers and co-workers attentively, constructively, and actively.

List of Sources:

AccuVision Workplace Success Skills System	Listening: Clearly understands and recalls oral instructions (e.g., understands instructions, implied meanings, remembers prior conversations accurately).
AON Consulting Survey of Human Resource Trends	Among skills identified by human resource professionals: Demonstrates communication skills.

Arizona Workplace Skills Standards (Draft)	Students use principles of effective oral, written and listening communication skills to make decisions and solve workplace problems, which includes delivering a speech clearly, with expression and in an organized fashion; making eye contact with the audience; conveying the message through non-verbal as well as verbal communications; describing communication practices used with sensory-impaired individuals; interpreting, clarifying, and evaluating a presenter's point of view. Speaking in a content area (e.g., science, social studies, and literature); using vocabulary of the subject accurately; locating and interpreting information in documents such as manuals, graphs and schedules; responding to oral and written presentation by formulating relevant feedback; expressing opinions; discerning the main idea; and distinguishing fact from opinion.
ASTD Update: Basic Skills	Individual competence skills: Demonstrates communication skills, comprehension.
Australia's Key Competencies	Communicating ideas and information: Communicates effectively with others using spoken expression.
Basic Skill Requirements for Selected Army Occupational Training Courses	Listening: Understands basic civilian vocabulary in information presented orally. Understanding main idea as presented orally. Understanding supporting details presented orally. Remembering information presented orally. Following oral instructions. Remembering a sequence of steps as presented orally. Generalizing from information presented orally. Using basic vocabulary understandably. Using speech patterns that are easily understood. Expressing thoughts clearly. Following written instructions. Following sequential order presented in writing. Remembering a sequence of steps as presented in writing. Following procedures as shown by demonstration. Remembering sequence of steps as shown by demonstration.
Basic Skills in the U.S. Work Force	Among skills identified by survey results: Engages critically and constructively in the exchange of ideas; identifies and comprehends the main and subordinate ideas in discussions, and reports accurately what others have said; conceives and develops ideas about a topic for the purpose of speaking to a group; chooses and organizes related ideas; presents them clearly in standard English; answers and asks questions coherently and concisely, and follows spoken instructions.
Bottom Line: Basic Skills in the Workplace	Among skills identified by small and medium-sized firms: Demonstrates communication skills.
Colorado Department of Education	Communication skills: Listens to others; speaks distinctly; formulates and asks questions; answers questions accurately; explains activities and ideas clearly; uses appropriate vocabulary/grammar; gives clear instructions and directions; stays on topic; uses non-verbal signs appropriately; develops oral presentations; presents information effectively to groups. Seeks clarification of instructions. Obtains an appreciation for foreign languages.
Consensus Framework for Workplace Readiness	Academic foundations: Demonstrates communication skills. Interpersonal: Listens attentively; communicates responsibly with co-workers.

Employer's Choice	Communicates effectively: Demonstrates speech and non-verbal communication skills (e.g., listening).
Equipped for the Future	Communication skills: Convey information, ideas, and opinions by speaking clearly, asking questions, monitoring the effectiveness of the message, and adjusting tone and content to fit a variety of audiences. Attend to what others say. Identify the perspective and intent of the speaker. Relate what is said to prior knowledge and experience. Evaluate and critique for content, purpose, and use.
Fort Worth: Project C^3	Speaking and listening: Ability to organize and express ideas, directions, and data in a logical sequence (e.g., describe how something works, explain to someone else how to perform a task).
Framework for Developing Skill Standards for Workplace Literacy	Oral communications: Listens, especially to follow verbal instructions to perform a job task; communicates thoughts, ideas, and information orally, attending to the comprehension of listeners and the demands of the setting; asks and answers simple questions; makes requests for supplies, days off, etc.; uses correct grammar and word choice.
Future Work	Executive and managerial skills: Demonstrates communication skills. Specialty skills: Demonstrates language skills.
Getting a Job after College	Functional skills: Demonstrates listening and verbal communication skills.
High School Curriculum Study	Among skills identified by survey results: Listens, speaks, follows spoken and written instructions.
High Schools and the Changing Workplace: The Employer's View	Command of English Language (category – no detail). Oral communication: Communicates in English, understands the intent and details of oral communication, understands and gives instructions, correctly identifies and summarizes principal and subsidiary ideas in discussions; obtains, clarifies, and verifies information through questioning, participating effectively in discussions.
Investing in Our Children	Among skills identified by both large and small companies: Demonstrates communication skills.
Job Skills for the 21st Century	Basic skills: Listening, speaking.
Kansas Business Survey	Among skills identified by surveyed businesses: Listening, oral communication.

Kansas Competency Index of Workplace Skills	Team member participation: Applies active listening skills, gives and follows oral directions.
Kentucky Council on Performance Standards	Speaking and listening: Engages in constructive spoken exchange of ideas in class discussions with peers and instructors; understands the main ideas of speeches, lectures, or media presentations; prepares and delivers oral presentations to different audiences; and communicates effectively in one-on-one dialogue. Listens critically to oral or media presentations and separates fact from opinion (bias, propaganda, etc.). Follows spoken instructions and asks questions.
Mexico's Occupational Analysis Study	Communication: [Level 5] Write and create presentations that inform, persuade or introduce new ideas or make proposals, draft technical reports or other specialized materials, including the translation of materials to other languages with accuracy. [Level 4] Present information on how to carry out work operations, write manuals for a system, draw graphs and tables according to specifications, design programs for use in education and training. [Level 3] Draft instructions on procedures, prepare tables and graphs to show information collected form different sources, use a second language for conveying instructions to others for carrying out an activity. [Level 2] Record events, write basic correspondences memorandums and e-mail messages so as to keep clients, suppliers and co-workers informed. [Level 1] Copying and recording information, such as keeping inventory or preparing a client list. Oral communication: [Level 5] Make presentations on a variety of subjects before different types of audiences, receive direct or indirect feedback accurately and give suitable replies to different speakers, and carry out interviews for the purpose of collecting information that is pertinent for decision making. [Level 4] Understand and communicate information generated at group discussions, and communicate ideas persuasively and present subjects or concrete data to pre-identified groups. [Level 3] Organize ideas and data so as to communicate clearly with others, formulate questions to receive new and additional information, and use basic technical language required in the workplace. [Level 2] Initiate simple communication and ask for clarification of data or instructions, and ask pertinent questions of the right person. [Level 1] Receive and understand simple verbal messages supported by some non-verbal information, answer direct questions, and confirm instructions and information.
Michigan Employability Skills	Academic skills: Speaks in the language in which business is conducted. Personal management skills: Follows oral instructions and directions, follows written instructions and directions.
National Vocational Qualifications (NVQ)	Communicates, demonstrates knowledge of modern foreign language.
New Standards Project	Separate standards for English Language Arts, which include speaking and listening.

New York State Education Department	Language arts skills: Listens/speaks for personal response, social interaction, information and understanding, critical analysis, and evaluation.
New Zealand's Essential Skills	Communication skills.
*O*NET*	Oral expression: The ability to communicate information and ideas in speaking so others will understand. Oral comprehension: The ability to listen to and understand information and ideas presented through spoken words and sentences. Speaking: Talking to others to effectively convey information. Active listening: Listening to what other people are saying and asking questions as appropriate. Communicating with supervisors, peers, or subordinates: Providing information to supervisors, fellow workers, and subordinates. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer. Communicating with persons outside the organization: Communicating with persons outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer.
PLATO Learning System	Communication.
Project BEL	Among skills identified by surveyed employers: Demonstrates communication skills.
Skill Demand, Changing Work Organization, and Performance	Communication skills: Demonstrates listening skills.
Teaching the New Basic Skills	Among six time-of-hire skills: Communicates effectively, both orally and in writing.
Texas Workplace Skills Inventory	Among skills identified as essential: Comprehends/acts appropriately on spoken instruction. Understands written sequential directions. Follows directions in personnel policy manual.

Vocational-Technical Consortium of States (VTECS)/ Illinois	Communicating on the job: Listens, uses correct grammar, communicates verbally with others, uses body language effectively, uses a telephone properly, asks questions, follows written and oral directions.
Washington Basic Skills	Giving information: Gives spoken instructions in the workplace, explains ideas from a work plan and options for implementation, interviews for a specific job, reports an emergency, chooses words/manner of expression appropriate to the workplace, communicates on the telephone, places orders, and explains products and services. Listening: Identifies basic elements of communication, uses attentive posture and maintains eye contact while listening, receives spoken instructions in the workplace, and distinguishes secondary methods of communication. Following directions: Reads labels, work instructions, maps, procedural manuals, product instructions, safety warnings, road/street signs/symbols, directions on a test; and determines sequential events/items.
Washington Workplace Competency Worksheet	Listening: Receives, interprets, and responds to verbal messages and other cues in ways that are appropriate to the purpose, comprehends and critically evaluates the speaker, hears the key points that make up a customer"s concerns, conveys an adequate response, and works effectively with customers, receives and responds to oral instructions, interprets and responds to nonverbal cues, and uses proper telephone techniques when communicating with others. Speaking: Speaks clearly and communicates a message, selects an appropriate medium for conveying information, provides information in a manner appropriate to the setting, presents clear and focused arguments to support position on issues, persuades others to take the desired course of action, and responds appropriately to feedback.
Work Keys	Literal comprehension, interpretation, critical listening.
Workforce Development Region IX Needs Assessment Survey Report	Among skills identified by businesses surveyed: Communicates responsibly with co-workers; possesses ESL skills.
Workplace Basics (Carnevale)	In the high performance organization, workers must be able to quickly articulate and express their ideas. They must be able to listen effectively to customers and co-workers and to respond appropriately. Workers today must be capable of communicating effectively with others. Listen effectively to customers and co-workers and responds appropriately.

Language and communication: Demonstrates listening and speaking skills.

SCANS Scales:

SCANS Scale Rationale:

Greater complexity of content, interpretation, and accessibility to both content and audience

↑

Basic or routine content, little interpretation, familiarity with both content and audience

Level 5	Chooses and organizes related ideas and presents them in an articulate and compelling fashion. Responds to vague or deceptive questions with diplomacy and differentiates between fictitious or emotional factors and the real facts. Detects and uses very subtle nonverbal cues. Uses vocabulary suitable to audience or communicant.
Level 4	Convinces by means of verbal and nonverbal strategies. Presents a specific subject to an audience and responds to questions. Expresses oneself using subtleties, humor, and nonverbal signs to communicate more effectively. Responds to negative or incomplete questions appropriately.
Level 3	Formulates questions and comments that may complement or add to the verbal information received in both interpersonal and group discussions. Interprets and responds to verbal communication, considering subtleties such as humor, tone of voice, and nonverbal signs. Enunciates correctly and uses inflection effectively.
Level 2	Verbalizes one's understanding of a series of instructions, expressing pertinent details and the general tone of a verbal message clearly. Makes routine oral reports according to pre-established instructions.
Level 1	Follows simple sequential instructions. Asks pertinent questions for clarification. Listens and reacts tactfully to communication. Interprets simple nonverbal cues such as tone of voice and facial expressions.

SCANS—O*NET Crosswalk:

O*NET Active Listening: (Technical Definition) Receives, interprets, and attends to verbal information and monitors comprehension of this material, asking questions as appropriate. (Operational Definition) Listening to what other people are saying and asking questions as appropriate.

O*NET Speaking: (Technical Definition) Communicates thoughts, ideas, and information orally, attending to the comprehension of listeners and the demands of the setting. (Operational Definition) Talking to others to effectively convey information.

Comments: The match between the SCANS definitions and O*NET definitions are strong. There is evidence of similar behaviors and an essence that they are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Listening and Speaking		*O*NET Active Listening and Speaking*	
Level 5	Chooses and organizes related ideas and presents them in an articulate and compelling fashion. Responds to vague or deceptive questions with diplomacy and differentiates between fictitious or emotional factors and the real facts. Detects and uses very subtle nonverbal cues. Uses vocabulary suitable to audience or communicant.	High	*Active Listening*: Presiding as judge in a complex legal disagreement. *Speaking*: Arguing a legal case before the Supreme Court.
Level 4	Convinces by means of verbal and nonverbal strategies. Presents a specific subject to an audience and responds to questions. Expresses oneself using subtleties, humor, and nonverbal signs to communicate more effectively. Responds to negative or incomplete questions appropriately.		
Level 3	Formulates questions and comments that may complement or add to the verbal information received in both interpersonal and group discussions. Interprets and responds to verbal communication, considering subtleties such as humor, tone of voice, and nonverbal signs. Enunciates correctly and uses inflection effectively.	Medium	*Active Listening*: Answering inquiries regarding credit references. *Speaking*: Interviewing applicants to obtain personal and work history.

SCANS Scale Rationale:

Greater complexity of content, interpretation, and accessibility to both content and audience

↑

Basic or routine content, little interpretation, familiarity with both content and audience

Level 2	Verbalizes one's understanding of a series of instructions, expressing pertinent details and the general tone of a verbal message clearly. Makes routine oral reports according to pre-established instructions.	➨	Low	*Speaking*: Greeting tourists and explaining tourist attractions.
Level 1	Follows simple sequential instructions. Asks pertinent questions for clarification. Listens and reacts tactfully to communication. Interprets simple nonverbal cues such as tone of voice and facial expressions.			*Listening*: Taking a customer's order.

Other O*NET Links:

The O*NET framework contains other references to listening and speaking. These include:

Oral Expression (Worker Characteristics): The ability to communicate information and ideas in speaking so others will understand.

Oral Comprehension (Worker Characteristics): The ability to listen to and understand information and ideas presented through spoken words and sentences.

Communicating with Supervisors, Peers, or Subordinates (Occupation Requirements): Providing information to supervisors, fellow workers and subordinates. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer.

Communicating with Persons Outside the Organization (Occupation Requirements): Communicating with persons outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer.

Assessments:

Basic Skills Tests	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Writing Arithmetic/Mathematics **Listening** Decision making Problem solving Reasoning
Comprehensive Adult Student Assessment System (CASAS)	CASAS 8910 Clairemont Mesa Blvd. San Diego, CA 92123-1104 (619)292-2900 (800)255-1036	Reading Writing Mathematics **Listening/Speaking** Problem solving
Industrial Psychology International, Ltd. -- Fluency	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Interprets and communicates information Participates as a member of a team Serves clients/customers Negotiates to arrive at a decision **Speaking** Creative thinking
Industrial Psychology International, Ltd. -- Verbal Proficiency Assessment (VPA)	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates human resources Interprets and communicates information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Understands systems **Speaking**

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing **Speaking** Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

FOUNDATION SKILLS: Thinking Skills

Creative Thinking

SCANS Definition:	Uses imagination freely, combines ideas or information in new ways, makes connections between seemingly unrelated ideas, and reshapes goals in ways that reveal new possibilities.
Panel Comments:	The idea or information created must have "added value" for work or society. Other suggested skills to include in the definition include: recognizing something new; the ability to associate; brainstorming; looking at problems, situations, and products in new ways; encouraging creativity in others; aiming for improvements; and looking for new uses or applications.
Summary of Literature Review:	Eighteen sources, listed below, were found to include some aspect of the skill "creative thinking" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition for creative thinking. However, several sources include the skills of improvising, reorganizing, and modifying. They say workers should be imaginative, intuitive, and inventive, looking at old problems in new ways and using creative thinking for improvement.
List of Sources:	
AON Consulting Survey of Human Resource Trends	Among skills identified by human resource professionals: Exhibits creativity/innovation.
Arizona Workplace Skills Standards (Draft)	Apply critical and creative thinking skills to make decisions and solve workplace problems.
ASTD Update: Basic Skills	Group and organizational effectiveness skills: Exhibits creativity.
California Career-Technical Assessment Program (CTAP)	Creative thinking skills.
Colorado Department of Education	Creative/innovative skills: Creates and develops plans for improvement, demonstrates imaginative thinking (new ways of doing things), and demonstrates ability to improvise.

Consensus Framework For Workplace Readiness	Thinking/problem solving skills: Incorporates creativity, intuition, hunches.
Employer's Choice	Exhibits positive work attitudes: Demonstrates creativity.
Fort Worth: Project C^3	Originality and creativity: Redefines concepts or theories discovered or developed by others.
Fourth R: Workforce Readiness	Among skills comprising the Fourth R: Exhibits creativity.
Future Work	Positive skills or attributes: Exhibits creativity, inventiveness.
Job Skills for the 21st Century	Thinking skills: Creative thinking.
Kansas Competency Index of Workplace Skills	Creative thinking: Reorganizes information and assumptions about a given problem, connects ideas for which connections are not apparent.
Kentucky Council on School Performance Standards	Personal attributes of a self-sufficient individual: Is resourceful and creative.

*O*NET*	Originality: The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem. Fluency of ideas: The ability to come up with a number of ideas about a given topic. It concerns the number of ideas produced and not the quality, correctness, or creativity of the ideas. Innovation: Job requires creativity and alternative thinking to come up with new ideas for and answers to work-related problems. Idea generation: Generating a number of different approaches to problems. Thinking creatively: Originating, inventing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.
Skill Demand, Changing Work Organization, and Performance	Thinking skills: Thinks creatively.
Washington Workplace Competency Worksheet	Creative thinking: Identifies situation-related problems and their causes; chooses, evaluates, and modifies solutions as needed and determines consequences; combines ideas or information in new and imaginative ways; makes connections between seemingly unrelated ideas and reshapes goals in ways that reveal new possibilities; and visualizes and thinks conceptually.
Workplace Basics (Carnevale)	Workers must be able to look at old problems in new ways, and approach them with flexible solutions. Encouraging workers to think creatively and solve problems promotes work involvement, motivation, and decision-making activities.
Young People's Participation in Post-Compulsory Education and Training	Problem solving: Demonstrates creative thinking skills.

SCANS Scales:

SCANS Scale Rationale:

Higher degree of adaptation and/or innovation

↑

Lesser degree of adaptation and/or innovation

Level 5	Creates original applications or solutions that address overreaching problems or goals. Leads colleagues in generating ideas that bring about ideas from unrelated fields or applications.
Level 4	Creates original applications or solutions for a specific problem from the manipulation or transformation of ideas or objects. Leads others in generating ideas by initiating a string of thought or guiding a discussion.
Level 3	Connects or combines ideas or objects from unrelated fields or applications. Generates multiple ideas around a specific outcome or topic. Generates ideas independently and without censor.
Level 2	Manipulates or transforms ideas or objects from related fields or applications in new ways dismissing previous assumptions about their intended use and purpose. Participates with others in generating ideas. Delays judgement on the feasibility of ideas presented.
Level 1	Connects ideas or objects from related fields or applications to address an immediate problem or bring about a specific outcome. Follows only recognized guidelines for use and purpose.

SCANS—O*NET Crosswalk:

Comments: No equivalent. SCANS Thinking Skills and O*NET Complex Problem Solving Skills are strongly linked as a group. Each framework, however, organized the skills differently. SCANS divided the skills into activities, whereas O*NET outlined a sequenced process. There is no direct match of a single SCANS skill to a single skill in the O*NET process.

Other O*NET Links:

The O*NET framework contains other references to creative thinking. These include:

Idea Generation (Worker Requirements): Uses understanding of situation and/or key features of this relevant schema to generate or identify alternative problem solutions.

Originality (Worker Characteristics): The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.

Fluency of Ideas (Worker Characteristics): The ability to come up with a number of ideas about a given topic. It concerns the number of ideas produced and not the quality, correctness, or creativity of the ideas.

Thinking Creatively (Occupation Requirements): Originating, inventing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Assessments:

Employee Aptitude Survey (EAS)	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Arithmetic/Mathematics **Creative thinking** Problem solving Seeing things in the mind's eye Reasoning
Industrial Psychology International, Ltd. -- Fluency	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Interprets and communicates information Participates as a member of a team Serves clients/customers Negotiates to arrive at a decision Speaking **Creative thinking**

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task **Creative thinking** Problem solving Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Parts	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task **Creative thinking**
TABE (Test of Adult Basic Education) 7&8 Complete Battery	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics **Creative thinking** Problem solving Reasoning
TABE (Test of Adult Basic Education) 7&8 Survey	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics **Creative thinking** Problem solving Reasoning

TABE Work-Related Foundation Skills	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics **Creative thinking** Problem solving Reasoning
TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic **Creative thinking** Decision making Problem solving Seeing things in the mind's eye Reasoning

FOUNDATION SKILLS: Thinking Skills

Decision Making

SCANS Definition: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.

Panel Comments: Upper levels of decision-making involve a time period.

Decision-making takes place at personal, group, and organization levels

Suggested skill to include in the definition includes: considering complex and simple consequences attached to a decision.

Summary of Literature Review: Eleven sources, listed below, were found to include some aspect of the skill "decision making" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition for decision making. However, several sources include the behaviors of prioritizing, planning, organizing, identifying steps, thinking on one's feet, and taking responsibility for decisions. There are cross-references to the skill of acquiring and evaluating information, so it may be helpful to refer to that definition while refining this one.

List of Sources:

Arizona Workplace Skills Standards (Draft)	Apply critical and creative thinking to make decisions and solve workplace problems, which includes devising and implementing a plan of action by specifying goals and constraints; generating alternatives, considering risks, evaluating and choosing solutions; monitoring progress and making adjustments to meet stated objectives; and reflecting on the action taken to determine what has been gained, lost, or achieved.
Equipped for the Future	Decision-making skills: Set and prioritize goals for yourself or for an organization. plan and organize activities to achieve them.
High Schools and the Changing Workplace: The Employer's View	Reasoning and problem solving: Determines what is needed to accomplish work assignments.
Job Skills for the 21st Century	Thinking skills: Decision-making.
Kansas Competency Index of Workplace Skills	Decision making and problem solving: Identifies steps in the decision-making process.

Mexico's Occupational Analysis Study	Decision Making: [Level 5] Capable of evaluating and taking responsibility for decisions that may have long-term repercussions, relate probabilities of success or failure to economic and social costs, and make decisions conscientiously and systematically while under pressure and in a limited time period. [Level 4] Take responsibility for decisions that affect part of the organization, suggest reversible and irreversible alternatives, identify probability of success or failure, identify economic and organizational costs, and make decision within a reasonable time period. [Level 3] Take responsibility for decisions that affect third parties, suggest alternatives with mid-term reversible effects, associate cost to a work team or to a process, and make decisions based on experience. [Level 2] Share responsibility within a group, identify up to four consequences of an alternative, and make decisions intuitively. [Level 1] Take responsibility for themselves and their activities, and make decisions based on pre-established criteria and carry them out by means of initiative.
New Zealand's Essential Skills	Decision-making skills.
*O*NET*	Analytical thinking: Job requires analyzing information, and using logic to address work or job issues and problems. Judgment and decision making: Weighing the relative costs and benefits of a potential action. Making decisions and solving problems: Combining, evaluating, and reasoning with information and data to make decisions and solve problems. these processes involve making decisions about the relative importance of information and choosing the best solution.
Vocational-Technical Consortium of States (VTECS)/Illinois	Solving problems and critical thinking: Sets priorities, selects and implements options/decisions, prioritizes work assignments.
Washington Workplace Competency Worksheet	Decision making: Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative; makes decisions regarding the safety of workers and the workplace; and is able to think on feet. Thinking skills: Demonstrates creative thinking in making decisions, and uses critical, creative, and intuitive evaluation skills. Participates effectively in collaborative decision-making.
Young People's Participation in Post-Compulsory Education and Training	Problem solving: Demonstrates decision-making skills.

SCANS Scales:

SCANS Scale Rationale:

Greater complexity of judgement and the importance of the consequences

↑

Lesser complexity of judgement and affect on others

Level 5	Identifies all sound alternatives. Defines complex consequences. For example, a decision that resolves one problem may have consequences in another area.
Level 4	Identifies multiple sound alternatives for making a decision. Defines consequences in terms of time, costs, outcomes, and effects on the work process.
Level 3	Makes a decision in a timely manner. Identifies multiple alternatives for making a decision, and identifies more than one consequence for each alternative. Makes a decision that affects a group of workers or a work process.
Level 2	Makes a decision that considers pre-established criteria with multiple alternatives. Makes a decision that affects another worker.
Level 1	Makes an "A or B" decision that affects only one's own work and activities. Identifies at least one consequence for each alternative.

SCANS—O*NET Crosswalk:

Comments: No equivalent. SCANS Thinking Skills and O*NET Complex Problem Solving Skills are strongly linked as a group. Each framework, however, organized the skills differently. SCANS divided the skills into activities, whereas O*NET outlined a sequenced process. There is no direct match of a single SCANS skill to a single skill in the O*NET process.

Also noted from this comparison, SCANS includes the actual skill of choosing among alternatives. This element is missing in O*NET Complex Problem Solving Skills process. However, there is a link of SCANS Decision Making to O*NET System Skill "Judgement and Decision Making."

Other O*NET Links:

The O*NET framework contains other references to decision making. These include:

Judgement and Decision Making (Worker Requirements): Weighs the pros and cons of various actions in relation top broader goals under conditions where complete information is not available.

Making Decisions and Solving Problems (Occupation Requirements): Combining, evaluating, and reasoning with information and data to make decisions and solve problems. These processes involve making decisions about the relative importance of information and choosing the best solution.

Assessments:

Basic Skills Tests	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Writing Arithmetic/Mathematics Listening **Decision making** Problem solving Reasoning
Industrial Psychology International, Ltd. --Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking **Decision making** Problem solving Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking **Decision making** Problem solving Seeing things in the mind's eye Reasoning
Work Keys Locating Information	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	Reading **Decision making** Reasoning

FOUNDATION SKILLS: Thinking Skills

Problem Solving

SCANS Definition: Recognizes that a problem exists, identifies possible reasons for the discrepancy, devises and implements a plan of action to resolve it, evaluates and monitors progress, and revises plans as revealed by findings.

Panel Comments: Other skills to include in the definition include: Recognizing and defining the problem; troubleshooting; forming and testing hypotheses; analyzing problems; and identifying key causes and potential soultions.

Summary of Literature Review: Thirty-four sources, listed below, were found to include some aspect of the skill "problem solving" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition for problem solving. However, several sources include the behaviors of defining a problem, analyzing, troubleshooting, forming hypotheses, participating in consensus-building, and separating fact from fiction. They also mention handling unanticipated problems; identifying, collecting, and evaluating the information needed to solve a problem; predicting results and consequences of a solution; and identifying alternative solutions. Several sources say problem-solving should be done purposefully and quickly.

List of Sources:

AccuVision Workplace Success Skills System	Interacting with others: Identifies problems and means of dealing with them (e.g., offers good suggestions for ways to improve quality and productivity, and about how to handle unexpected problems).
AON Consulting Survey of Human Resource Trends	Among skills identified by human resource professionals: Demonstrates problem-solving skills.
ASTD Update: Basic Skills	Economic adaptability skills: Demonstrates problem-solving skills.
Australia's Key Competencies	Solving problems: Applies problem-solving strategies in purposeful ways, both in situations where the problem and the desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome.
Bottom Line: Basic Skills in the Workplace	Among skills identified by small and medium-sized firms: Demonstrates problem-solving skills.

California Career-Technical Assessment Project (CTAP)	Thinking and problem-solving skills: Problem-solving; recognizes problem situations; applies correct mathematical principles to estimate, measure, and calculate problems; proposes, evaluates, and selects alternative solutions when required.
Colorado Department of Education	Problem solving/reasoning skills: Identifies problems that need a solution; plans procedures, collects information/resources, organizes information/resources, interprets information, formulates alternative approaches, selects efficient approaches, implements procedures/strategies; reviews progress, evaluates activities, corrects errors, makes conclusions, summarizes and communicates results, and uses results to develop new ideas.
Consensus Framework for Workplace Readiness	Thinking/problem solving skills: Defines the problem; analyzes the problem and/or situation; evaluates available information; develops and analyzes potential solutions or options; monitors progress toward goals.
Employer's Choice	Accepts responsibility: Demonstrates problem-solving skills.
Equipped for the Future	Decision-making skills: Recognize a need for decisions to be made or problems solved. Generate new ideas and perspectives to develop alternative solutions. Decide on the best course to follow, and monitor the results to guide further actions.
Fort Worth: Project C^3	Reasoning and problem solving: Ability to identify and express problems, develop solutions from alternative methods and procedures; e.g., increase output on assembly line, etc.
Fourth R: Workforce Readiness	Among skills comprising the Fourth R: Demonstrates problem-solving, analysis skills.
Framework for Developing Skill Standards for Workplace Literacy	Problem solving: Understands basic problem-solving procedures and how these procedures might be used to address various problems; differentiates, sorts, and classifies information; formulates, evaluates, and chooses options in solving problems; troubleshoots, quickly identifies and solves problems as they arise; predicts outcomes based on available information; prioritizes job tasks for effectiveness and efficiency.
Getting a Job after College	Functional skills: Demonstrates problem-solving and analysis skills.
High School Curriculum Study	Among skills identified by survey results: Thinks and solves problems.
High Schools and the Changing Workplace: The Employer's View	Reasoning and problem solving: Identifies problems, considers and evaluates possible alternative solutions, weighs their risks and benefits, formulates and reaches decisions logically, separates fact from opinion, adjusts to unanticipated situations by applying established rules and facts, works out new ways of handling recurring problems, determines what is needed to accomplish work assignments.

Investing in Our Children	Among skills important for entry-level workers: Demonstrates problem-solving skills.
Job Skills for the 21st Century	Thinking skills: Problem-solving.
Kansas Business Survey	Among skills identified by surveyed businesses: Problem-solving skills.
Kansas Competency Index of Workplace Skills	Decision making and problem solving: Recognizes or identifies a problem, identifies information needed to solve a problem, describes application and likely consequences of alternative solutions.
Kentucky Council on School Performance Standards	Thinking and problem solving: Identifies and formulates problems or develops a problem statement; identifies what is known and what needs to be known to address the problem, locates and organizes information, develops alternative solutions to problems; makes informed decisions in selecting a possible solution to the problem; and evaluates solutions.
Michigan Employability Skills	Academic skills: Uses scientific methods to solve problems; identifies and suggests new ways to get the job done.
National Vocational Qualifications (NVQ)	Demonstrates problem-solving skills.
New Standards Project	Solving problems: Establishes major factors affecting processes and outcomes and adapts and manipulates processes to achieve appropriate completion; anticipates problems and opportunities and the conditions under which they arise; establishes and uses criteria for judging effectiveness of processes and outcomes.
New Zealand's Essential Skills	Problem-solving.

*O*NET*	Making decisions and solving problems: Combining, evaluating, and reasoning with information and data to make decisions and solve problems. These processes involve making decisions about the relative importance of information and choosing the best solution. Problem sensitivity: The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem. Identification of key causes: Identifying the things that must be changed to achieve a goal. Implementation planning: Developing approaches for implementing an idea. Solution appraisal: Observing and evaluating the outcomes of a problem solution to identify lessons learned or redirect efforts. Problem identification: Identifying the nature of problems.
Skill Demand, Changing Work Organization, and Performance	Thinking skills: Demonstrates problem-solving skills.
Teaching the New Basic Skills	Among six time-of-hire skills: The ability to solve semi-structured problems where hypotheses must be formed and tested.
Vocational-Technical Consortium of States (VTECS)/Illinois	Solving problems and critical thinking: Identifies the problem, assesses values and norms, identifies attitudes and beliefs, clarifies purposes and goals, identifies available solutions and their impact, evaluates options, assesses employer/employee responsibility in solving a problem.
Washington Basic Skills	Problem solving: Identifies work-related problems and possible solutions.
Washington Workplace Competency Worksheet	Problem solving: Devises innovative solutions when needed; recognizes and defines problems, invents and implements solutions, and tracks and evaluates results; examines problems in innovative ways; understands the value of consensus building in problem-solving; listens to others' viewpoints regarding a course of action; considers such factors as ethnic diversity in effective decision-making; approaches and analyzes problems systematically; discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem; uses logic to draw conclusions from available information; extracts rules or principles from a set of objects or written text; and applies rules and principles to new situations; or determines which conclusions are correct when given a set of facts and a set of conclusions.

Workforce Development Region IX Needs Assessment Survey Report	Among skills identified by businesses surveyed: Demonstrates problem-solving skills.
Workplace Basics (Carnevale)	Workers must be able to look at old problems in new ways, and approach them with flexible solutions. Encouraging workers to think creatively and solve problems promotes work involvement, motivation, and decision-making activities.
Young People's Participation in Post-Compulsory Education and Training	Problem solving: Demonstrates analysis skills.

SCANS Scales:

SCANS Scale Rationale:

Proactive

↑

Reactive

Level 5	Identifies and resolves a problem with causes that extend outside the immediate system. Analyzes current information or processes to identify areas of future problems. Plans and executes steps that require multiple sequences or schedules to resolve problems.
Level 4	Identifies and investigates less perceivable abnormalities that require obtaining further information from non-immediate sources and takes appropriates steps to resolve the problem. Adjusts actions during the resolution of a problem based on feedback.
Level 3	Identifies a sequence of events that causes a problem. Prioritizes and implements the steps necessary to resolve the problem events. Identifies and investigates easily perceived abnormalities that indicate something is likely to be wrong and takes actions to resolve the problems. Monitors actions taken to resolve a problem.
Level 2	Identifies the main source of a problem and follows set guidelines or procedures to resolve the problem. Follows up on the problem to assure that it is resolved correctly.
Level 1	Recognizes that a problem exists and informs appropriate contact person.

SCANS—O*NET Crosswalk:

Comments: No equivalent. SCANS Thinking Skills and O*NET Complex Problem Solving Skills are strongly linked as a group. Each framework, however, organized the skills differently. SCANS divided the skills into activities, whereas O*NET outlined a sequenced process. There is no direct match of a single SCANS skill to a single skill in the O*NET process.

Other O*NET Links:

The O*NET framework contains other references to problem solving. These include:

Identification of Key Causes (Worker Requirements): Can identify those variables that have the strongest effects on the system operations and the variables to be manipulated to bring about desired outcomes.

Problem Identification (Worker Requirements): Reflects the restructuring of an ill-defined situation such that the basic nature of the problem and requisite problem solving strategies are identified.

Implementation Planning (Worker Requirements): Creates a mental representation or formal plan for implementing a solution and identifies appropriate actions and timing of actions to implement plan.

Solution Appraisal (Worker Requirements): Observes and evaluates problem solving activities using observations to adjust strategies and structure experience.

Problem Sensitivity (Worker Characteristics): The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Assessments:

Basic Skills Tests	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Writing Arithmetic/Mathematics Listening Decision making **Problem solving** Reasoning
Comprehensive Adult Student Assessment System (CASAS)	CASAS 8910 Clairemont Mesa Blvd. San Diego, CA 92123-1104 (619)292-2900 (800)255-1036	Reading Writing Mathematics Listening/Speaking **Problem solving**
Cornell Critical Thinking Test, Level X	Critical Thinking Books and Software P.O. Box 448 Pacific Grove, CA 93950-0448 (831)393-3288 (800)458-4849	**Problem solving** Reasoning
Cornell Critical Thinking Test, Level Z	Critical Thinking Books and Software P.O. Box 448 Pacific Grove, CA 93950-0448 (831)393-3288 (800)458-4849	**Problem solving** Reasoning
Employee Aptitude Survey (EAS)	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Arithmetic/Mathematics Creative thinking **Problem solving** Seeing things in the mind's eye Reasoning

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking **Problem solving** Seeing things in the mind's eye Reasoning

Industrial Psychology International Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making **Problem solving** Reasoning Responsibility Self-esteem Social Self-management Integrity/Honesty
Professional Employment Test	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Arithmetic/Mathematics **Problem solving** Reasoning
TABE (Test of Adult Basic Education) 7&8 Complete Battery	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics Creative thinking **Problem solving** Reasoning

TABE (Test of Adult Basic Education) 7&8 Survey	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics Creative thinking **Problem solving** Reasoning
TABE Work-Related Foundation Skills (TABE-WF)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics Creative thinking **Problem solving** Reasoning

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making **Problem solving** Seeing things in the mind's eye Reasoning
Watson-Glaser Critical Thinking Appraisal, Forms A and B, (WGCTA), 1980	The Psychological Corporation 555 Academic Court San Antonio, TX 78204 (800) 211-8378	Acquires and evaluates information **Problem solving** Reasoning
Work Keys Applied Technology	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	**Problem solving** Reasoning

Work Keys *Teamwork*	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	Listening **Problem solving**

FOUNDATION SKILLS: Thinking Skills

Seeing Things in the Mind's Eye

SCANS Definition: Organizes and processes symbols, pictures, graphs, objects, or other information (e.g., sees a building from a blueprint, a system's operation from schematics, and the flow of work activities from narrative descriptions).

Panel Comments: The title of this skill area does not translate well. A better title would be "Visualization."

Missing from the definition is the action that results from this skill (i.e., visualize, then do).

Summary of Literature Review: Four sources, listed below, were found to include some aspect of the skill "seeing things in the mind's eye" as part of their definition of necessary workplace skills. Though few sources refered to the skills outlined in this SCANS definition, those that did generally supported it and included the need for spatial ability and perspective.

List of Sources:

Basic Skill Requirements for Selected Army Occupational Training Courses	Math: Relating schematic or diagram to real situation; relating picture to real situation.
Future Work	Positive skills or attributes: Demonstrates spatial ability.
Job Skills for the 21st Century	Thinking skills: Visualization.
*O*NET*	Visioning: Create and apply a cognitive template or mental model describing how components of a system should interact under ideal conditions. Spatial orientation: The ability to know one's location in relation to the environment, or to know where other objects are in relation to one's self. Visualization: The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.

SCANS Scales:

SCANS Scale Rationale:

Greater level of detail and mental manipulation
↑
Basic recognition and recall

Level 5	Visualizes objects or processes from mathematical or scientific concepts and prepares a visual or verbal representation. From output data/information, visualizes processes or systems and identifies potential problems or malfunctions.
Level 4	Combines visual or verbal representations of an object or process obtained from different sources to create a three-dimensional mental picture. Visualizes yet-to-be-realized objects or processes and prepares a visual or verbal representation. Visualizes internal components and operations of machines or systems and predicts outcomes. Completes a mental picture from incomplete information.
Level 3	From a two-dimensional representation or a verbal description of an object or arrangement of objects, or a process or sequences of activities, creates a three-dimensional mental picture. Mentally operates or manipulates components of an object. Visualizes exact details of a specific object to distinguish from others. Mentally coordinates objects in a space with regards to size, color, function, and visual presentation.
Level 2	From a two-dimensional representation of an object or arrangement of objects, creates a two-dimensional mental picture with regards to obvious features that distinguish objects from one another, and the spatial relationship between objects. Uses mental picture to recognize the exact object in the future or to create the spatial arrangement of the objects. Manipulates a mental picture two dimensionally to make alterations to the spatial relationship of objects.
Level 1	By seeing a basic or familiar object, create a two-dimensional mental picture of the object with regards to basic shape and color. Uses mental picture to recognize similar objects in the future.

SCANS—O*NET Crosswalk:

Comments: No equivalent. SCANS Thinking Skills and O*NET Complex Problem Solving Skills are strongly linked as a group. Each framework, however, organized the skills differently. SCANS divided the skills into activities, whereas O*NET outlined a sequenced process. There is no direct match of a single SCANS skill to a single skill in the O*NET process.

There is a partial link to O*NET System Skills "Visioning." SCANS include the visual perception of physical objects, models, and processes. O*NET is limited to activities and processes of a system, which may include objects but is not specifically stated.

Other O*NET Links:

The O*NET framework contains other references to seeing things in the mind's eye. These include:

Visioning (Worker Requirements): Create and apply a cognitive template or mental model describing how components of a system should interact under ideal conditions.

Spatial Orientation (Worker Characteristics): The ability to know one's location in relation to the environment, or to know where other objects are in relation to one's self.

Visualization (Worker Characteristics): The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.

Assessments:

Employee Aptitude Survey (EAS)	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Arithmetic/Mathematics Creative thinking Problem solving **Seeing things in the mind's eye** Reasoning
Flanagan Aptitude Classification Tests (FACT)	NCS Workforce Development Group 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Reading Writing Arithmetic **Seeing things in the mind's eye** Reasoning
Flanagan Industrial Tests (FIT)	NCS Workforce Development Group 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Allocates time Reading Arithmetic/Mathematics **Seeing things in the mind's eye** Reasoning
Industrial Psychological International, Ltd. -- Blocks	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	**Seeing things in the mind's eye**

Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving **Seeing things in the mind's eye** Reasoning

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving **Seeing things in the mind's eye** Reasoning

FOUNDATION SKILLS: Thinking Skills

Knowing How to Learn

SCANS Definition: Recognizes and can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations, and is aware of learning tools such as personal learning styles (e.g., visual, aural) and formal and informal learning strategies.

Panel Comments: The learner must be motivated to learn. They must be able to learn independently and quickly.

Other skills to include in the definition include: self-assesses what one knows and needs to know; and uses learning strategies, such as note taking, to support learning.

Skills must be constantly learned or refreshed as the context of the work environment constantly changes.

Summary of Literature Review: Twenty-two sources, listed below, were found to include some aspect of the skill "knowing how to learn" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition of knowing how to learn. Additional behaviors mentioned include developing schema and developing alternative strategies. The sources also mention the need for motivation and self-assessment.

List of Sources:

AccuVision Workplace Success Skills System	Trainability: Learns new skills and knowledge (e.g., learns new work procedures quickly, takes on additional responsibilities with minimal training).
ASTD Update: Basic Skills	Economic adaptability skills: Demonstrates learning ability.
Basic Skill Requirements for Selected Army Occupational Training Courses	Listening: Knowing how to memorize. Study skills: Taking course notes, relating course notes to material covered in class, concentrating while studying or working, giving appropriate attention to details, persevering (completing assigned task).
Equipped for the Future	Lifelong learning skills: Recognize and value the variety of learning styles used by others as well as yourself. Apply existing skills to new situations. Use new ways of thinking, and learn new skills. Common activities: Look ahead to challenges and prepare for them by learning new skills and adapting current skills to new challenges, and learning from your own and other's experiences.

Framework for Developing Skill Standards for Workplace Literacy	Knowing how to learn: Identifies and uses various alternative strategies for working on learning tasks, looking for examples, taking notes, and identifying alternative strategies for working with this material; applies appropriate learning style, techniques, strategies, tools, and resources; manages time effectively, estimating the time to perform each task; maintains a high level of concentration.
Future Work	Positive skills or attributes: Demonstrates capacity for learning.
Getting a Job after College	Adaptive skills: Is a quick learner.
High Schools and the Changing Workplace: The Employer's View	Personal work habits: A willingness to learn.
Investing in Our Children	Among skills identified by large companies: Knows how to learn. Among skills important for all workers: Demonstrates ability to learn new information.
Kansas Competency Index of Workplace Skills	Learning strategies: Organizes learning activities, seeks feedback, locates and uses expert sources.
Kentucky Council on School Performance Standards	Personal attributes of self-sufficient individual: Can learn independently.
Michigan Employability Skills	Personal management skills: Learns new skills; works in changing setting.
National Vocational Qualifications (NVQ)	Improves own learning and performance.

New Standards Project	Learning and teaching on demand: Self-assesses what one knows and what one needs to learn and finds good sources of information, including knowledgeable people; develops an overview schema to guide one's study; poses and answers questions for oneself; elaborates on information so as to understand it better; seeks feedback on one's learning progress; and uses other processes to monitor and manage the learning process.
New Zealand's Essential Skills	Work and study skills.
*O*NET*	Memorization: The ability to remember information such as words, numbers, pictures, and procedures. Learning strategies: Using multiple approaches when learning or teaching new things. Active learning: Working with new material or information to grasp its implications. Updating and using job-relevant knowledge: Keeping up-to-date technically and knowing one's own job's and related jobs' functions.
Project BEL	Among skills identified by surveyed employers: Knows how to learn.
Survey of San Francisco Employers	Among desirable characteristics identified by employers: Seems to have the ability to learn quickly.
Washington Workplace Competency Worksheet	Knowing how to learn: Is aware of learning tools such as personal learning styles; uses learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations; employs formal and informal learning strategies; and learns a particular skill of an available job.
Work Keys	Observation skills: Visual auditory perception and integration; and memory.
Workforce LA	Trainability: Learns new information quickly.
Workplace Basics (Carnevale)	Individuals must have the ability to rapidly acquire new skills and information that applies to the workplace. To remain competitive, American workers must be able to quickly pick up and assimilate new facts for solving workplace problems. According to the researchers, this foundation skill is essential for acquisition of all the subsequent skill groups on the hierarchy.

SCANS Scales:

SCANS Scale Rationale:

Multiple learning styles
↑
Basic learning strategy

Level 5	Applies knowledge from past experiences to understand new tasks. Applies multiple learning styles to a learning situation.
Level 4	Identifies general rules or patterns that govern a task or procedure and applies them to understand different, yet similar tasks or procedures. Determines among learning styles a style to suit a learning situation.
Level 3	Uses tools or aids, such as note taking, to learn a series of tasks or multiple-step procedure. Identifies an alternate learning style and organizes information to suit style.
Level 2	Uses active listening (listening and asking questions) to understand information or a task. Uses memorization and repetition to learn a series of tasks or multiple-step procedure. Identifies preferred learning style and organizes information to suit style.
Level 1	Uses memorization and repetition to learn a task. Applies knowledge from outcomes to revise or change behavior.

SCANS—O*NET Crosswalk:

O*NET Learning Strategies: (Technical Definition) Identifies and uses various alternative strategies for working on learning tasks, looking for examples, taking notes, and identifying alternating strategies for working with this material. (Operational Definition) Using multiple approaches when learning or teaching new things.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and as essence that the two are meaning to communicate the same skills. Although a relationship exists at the definition level, the scales developed from each definition follow different rationale. Therefore, the relationship at the scale level is not a good one.

*Other O*NET Links:*

The O*NET framework contains other references to knowing how to learn. These include:

Memorization (Worker Characteristics): The ability to remember information such as words, numbers, pictures, and procedures.

Active Learning (Worker Requirements): Works with new information and concepts actively seeking to identify the meaning and implications of these concepts as they apply to problem solving.

Updating and Using Job-Relevant Knowledge (Occupational Requirements): Keeping up-to-date technically and knowing one's own jobs' and related jobs' functions.

Assessments:

No assessments listed.

FOUNDATION SKILLS: Thinking Skills

Reasoning

SCANS Definition: Discovers rules or principles underlying the relationship between two or more objects and applies it in solving a problem, uses logic to draw conclusions from available information, extracts rules or principles from a set of objects or written text, applies rules and principles to a new situation or determines which conclusions are correct when given a set of facts and a set of conclusions.

Panel Comments: The skill of generalizing should be included in the definition.

Summary of Literature Review: Seventeen sources, listed below, were found to include some aspect of the skill "reasoning" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition of reasoning, but many sources refer instead to critical thinking. Those have been included here as well. Behaviors not explicitly mentioned in the SCANS definition include analyzing the strengths and weaknesses of arguments; recognizing fallacies in reasoning; judging the credibility of sources; recognizing the difference between fact and opinion; and comparing and contrasting. Some sources differentiate between inductive and deductive reasoning.

List of Sources:

AON Consulting Survey of Human Resource Trends — Among skills identified by human resource professionals: Demonstrates reasoning ability.

Arizona Workplace Skills Standards — Students apply critical and creative thinking skills to make decisions and solve workplace problems.

Basic Skills in the U.S. Work Force — Among skills identified by survey results: Identifies and formulates problems, as well as proposes and evaluates ways to solve them; recognizes and uses inductive and deductive reasoning, and to recognizes fallacies in reasoning; draws reasonable conclusions from information found in various sources, whether written, spoken, tabular, or graphic, and defends conclusions rationally; comprehends, develops, and uses concepts and generalizations; distinguishes between fact and opinion.

California Career-Technical Assessment Project (CTAP) — Thinking and problem-solving skills: Exhibits critical thinking and logical reasoning.

Fort Worth: Project C^3	Reasoning and problem solving: Ability to identify and express problems, develop solutions from alternative methods and procedures; e.g., increase output on assembly line.
Fourth R: Workforce Readiness	Among skills comprising the Fourth R: Demonstrates thinking skills.
Framework for Developing Skill Standards for Workplace Literacy	Critical thinking: Recognizes and can analyze the strengths and weaknesses of arguments and propositions using logic to establish the validity of these propositions; participates in brainstorming sessions; judges the credibility of sources of information; distinguishes major problems form minor ones; differentiates between relevant and irrelevant information; compares and contrasts information.
Future Work	Positive skills or attributes: Demonstrates reasoning abilities.
New York State Education Department	Expanded basics: Demonstrates reasoning skills.
*O*NET*	Deductive reasoning: The ability to apply general rules to specific problems to come up with logical answers. It involves deciding if an answer makes sense. Inductive reasoning: The ability to combine separate pieces of information, or specific answers to problems, to form general rules or conclusions. It includes coming up with a logical explanation for why a series of seemingly unrelated events occur together. Idea evaluation: Evaluating the likely success of an idea in relation to the demands of the situation. Critical thinking: Using logic and analysis to identify the strengths and weaknesses of different approaches.
Project BEL	Among skills identified by surveyed employers: Demonstrates critical thinking ability.
Skill Demand, Changing Work Organization, and Performance	Thinking skills: Demonstrates reasoning skills.
Vocational-Technical Consortium of States (VTECS)/Illinois	Solving problems and critical thinking: Employs reasoning skills.

Washington Workplace Competency Worksheet	Thinking skills: Reasoning.
Work Keys	Observation; logic.
Workforce LA	Basic skills: Demonstrates critical thinking skills.
Young People's Participation in Post-Compulsory Education and Training	Problem solving: Demonstrates critical thinking skills.

SCANS Scales:

SCANS Scale Rationale:

Proactive
↑
Reactive

Level 5	Deconstructs other positions in order to respond to them.
Level 4	Identifies weaknesses in own position. Anticipates opponents' positions.
Level 3	Uses conclusions from facts and principles to construct a position.
Level 2	After drawing conclusions from multiple observations, identifies a principle
Level 1	Draws a conclusion from a set of facts.

SCANS—O*NET Crosswalk:

O*NET Critical Thinking: (Technical Definition) Recognizes and can analyze the strengths and weaknesses of arguments and propositions using logic to establish the validity of these propositions. (Operational Definition) Using logic and analysis to identify the strengths and weaknesses of different approaches.

Comments: The match between the SCANS definition and O*NET definition is strong. There is evidence of similar behaviors and as essence that the two are meaning to communicate the same skills.

Crosswalk to O*NET Scale Anchors:

SCANS Scale Rationale:

Proactive
↑
Reactive

SCANS Reasoning			*O*NET Critical Thinking*	
Level 5	Deconstructs other positions in order to respond to them.	➨	High	Writing a legal brief challenging a federal law.
Level 4	Identifies weaknesses in own position. Anticipates opponents' positions.			
Level 3	Uses conclusions from facts and principles to construct a position.			
Level 2	After drawing conclusions from multiple observations, identifies a principle.	➨	Medium	Evaluating customer complaints and determining appropriate responses.
Level 1	Draws a conclusion from a set of facts.	➨	Low	Determining whether a subordinate has a good excuse for being late.

Other O*NET Links:

The O*NET framework contains other references to reasoning. These include:

Deductive Reasoning (Worker Characteristics): The ability to apply general rules to specific problems to come up with logical answers. It involves deciding if an answer makes sense.

Inductive Reasoning (Worker Characteristics): The ability to combine separate pieces of information, or specific answers to problems, to form general rules or conclusions. It includes coming up with a logical explanation for why a series of seemingly unrelated events occur together.

Idea Evaluation (Worker Requirements): Uses available expertise or mental models to identify various consequences of a proposed solution recommending changes or implementation as appropriate.

Assessments:

Basic Skills Tests	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Writing Arithmetic/Mathematics Listening Decision making Problem solving **Reasoning**
Comprehensive Ability Battery (CAB)	Institute for Personality and Ability Testing, Inc. (IPAT) P.O. Box 1188 Champaign, IL 61824-1188 (800)225-IPAT	Writing Arithmetic/Mathematics **Reasoning**
Cornell Critical Thinking Test, Level X	Critical Thinking Books and Software P.O. Box 448 Pacific Grove, CA 93950-0448 (831)393-3288 (800)458-4849	Problem solving **Reasoning**
Cornell Critical Thinking Test, Level Z	Critical Thinking Books and Software P.O. Box 448 Pacific Grove, CA 93950-0448 (831)393-3288 (800)458-4849	Problem solving **Reasoning**
Differential Aptitude Tests®, Fifth Edition (DAT®) 1990	Harcourt Brace Educational Measurement 555 Academic Court San Antonio, TX 78204-2498 (800)211-8378	Writing **Reasoning**
Employee Aptitude Survey (EAS)	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Arithmetic/Mathematics Creative thinking Problem solving Seeing things in the mind's eye **Reasoning**

Flanagan Aptitude Classification Tests (FACT)	NCS Workforce Development Group 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Reading Writing Arithmetic Seeing things in the mind's eye **Reasoning**
Flanagan Industrial Tests (FIT)	NCS Workforce Development Group 9701 West Higgins Road Rosemont, IL 60018-4720 (800)237-7685	Allocates time Reading Arithmetic/Mathematics Seeing things in the mind's eye **Reasoning**
Industrial Psychology International, Ltd. -- Judgement	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Teaches others Exercises leadership Negotiates to arrive at a decision Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Creative thinking Problem solving Seeing things in the mind's eye **Reasoning**

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving **Reasoning** Responsibility Self-esteem Social Self-management Integrity/Honesty
Professional Employment Test	Psychological Services, Inc. 100 West Broadway Suite 1100 Glendale, CA 91210 (818)244-0033	Reading Arithmetic/Mathematics Problem solving **Reasoning**
TABE (Test of Adult Basic Education) 7&8 Complete Battery	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics Creative thinking Problem solving **Reasoning**

TABE (Test of Adult Basic Education) 7&8 Survey	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics Creative thinking Problem solving **Reasoning**
TABE Work-Related Foundation Skills (TABE-WF)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Acquires and evaluates information Reading Writing Arithmetic/Mathematics Creative thinking Problem solving **Reasoning**

TABE Work-Related Problem Solving (TABE-PS)	CTB/McGraw-Hill 20 Ryan Ranch Road Monterey, CA 93940-5703 (831)393-7282 (800)538-9547	Allocates time Allocates money Allocates material and facility resources Allocates human resources Acquires and evaluates information Organizes and maintains information Interprets and communicates information Understands systems Monitors and corrects performance Improves and designs systems Selects technology Applies technology to task Reading Writing Arithmetic Creative thinking Decision making Problem solving Seeing things in the mind's eye **Reasoning**
Watson-Glaser Critical Thinking Appraisal, Forms A and B, (WGCTA), 1980	The Psychological Corporation 555 Academic Court San Antonio, TX 78204 (800)211-8378	Acquires and evaluates information Problem solving **Reasoning**
Work Keys Applied Technology	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	Problem solving **Reasoning**
Work Keys Locating Information	ACT, Inc. P.O. Box 168 Iowa City, IA 52243-0168 (800)WORKKEY	Reading Decision making **Reasoning**

FOUNDATION SKILLS: Personal Qualities

Responsibility

SCANS Definition:	Exerts a high level of effort and perseverance toward goal attainment; works hard to become excellent at doing tasks by setting high standards, paying attention to details, working well, and displaying a high level of concentration even when assigned an unpleasant task; displays high standards of attendance, punctuality, enthusiasm, vitality, and optimism in approaching and completing tasks.
Panel Comments:	Other skills to include in the definition include: gives a consistent level of effort; takes initiative; assumes personal responsibility; takes responsibility for own actions; and works toward goals.
Summary of Literature Review:	Twenty-seven sources, listed below, were found to include some aspect of the quality "responsibility" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition of responsibility. However, several sources include the behaviors of taking initiative; assuming personal responsibility; taking responsibility for own actions; and recognizing issues that should be dealt with by the employee versus those that should be dealt with by a supervisor. Reliability was also included.
List of Sources:	
AccuVision Workplace Success Skills System	Structuring work activities: Recognizes issues which s/he should handle versus those to be dealt with by supervisors.
Bottom Line: Basic Skills in the Workplace	Among skills identified by small and medium-sized firms: Accepts responsibility, exhibits perseverance and reliability.
California Career-Technical Assessment Project (CTAP)	Personal skills: Persevering; accepts supervision.
Chamber of Commerce and National Association of Manufacturers' Survey	Among skills identified by surveyed employers: Exhibiting good attendance, punctuality, and work attitudes.

Colorado Department of Education	Interpersonal skills: Acts on suggestions about improving skills; maintains punctuality, meets attendance requirements, accepts assignments, takes responsibility for own actions, maintains consistent effort, works independently, manages time effectively; applies standards of quality to work assignments, adheres to policies and regulations, demonstrates enthusiasm for work/studies, and takes pride in accomplishments.
Consensus Framework for Workplace Readiness	Personal management: Acts responsibly, dependably, and conscientiously; demonstrates promptness; avoids absenteeism; actively participates in work-related discussions; respects the dignity of work; carries out assigned duties; works to help achieve organization goals; demonstrates loyalty to the organization and its goals.
Employability Inventory	Among skills in the profile of ideal employee: Is responsible (performs the job with proper standards and uses care in handling tools and equipment); is an initiator (performs assigned tasks at or above the required level); is conscientious (meets expectations of performance by spending additional time when necessary to accomplish a task at a high standard); is dependable (arrives at work punctually and consistently and attends all expected functions).
Employer's Choice	Accepts responsibility: Assumes personal responsibility; takes the initiative. Cooperates with others: Works well under supervision. Exhibits positive work attitudes: Willing to learn, takes pride in work. Practices good work habits: Maintains regular attendance, is thorough; follows company rules.
Equipped for the Future	Common activities: Act and advocate on behalf of yourself and others based on knowledge of your rights and responsibilities of those and others.
Fourth R: Workforce Readiness	Among skills comprising the Fourth R: Exhibits reliability; responsibility.
Getting a Job after College	Adaptive skills: Possesses a positive attitude.
High Schools and the Changing Workplace: The Employer's View	Personal work habits: Self-discipline, which includes regular and punctual attendance and dependability; accepts responsibility; works with or without supervision; understands the need for organization, supervision, rules, policies, and procedures.
Investing in Our Children	Among skills identified by large companies: Strives to work well. Among skills important for entry-level workers: Exhibits enthusiasm; takes pride in work; assumes responsibility.

Kansas Business Survey	Among skills identified by surveyed businesses: Exhibits proper attitudes toward work, demonstrates proper work habits.
Kansas Competency Index of Workplace Skills	Self-management: Demonstrates dependability and punctuality; accepts responsibility. Work ethics: Accepts responsibility for position; applies employee rules, regulations, and policies in a given occupational area.
Kansas Competency Index of Workplace Skills	Self-management: Demonstrates dependability and punctuality; accepts responsibility. Work ethics: Accepts responsibility for position; applies employee rules, regulations, and policies in a given occupational area.
Mexico's Occupational Analysis Study	Interpersonal/social skills: [Level 5] Practice leadership and motivation to perform negotiation, persuasion, and promotion to achieve the desired goals, get and keep the confidence of those with whom they interact, promote the professional and personal development of peers and subordinates. [Level 4] Respond adequately to diverse situations, accept personal doubts and criticism of their work with maturity, adapt, easily, to different socio-cultural characteristics, and resolve inter-personnel conflicts in the workplace. [Level 3] Understand the diversity of opinions within a group, and coordinate and propitiates a joint effort toward the achievement of objectives. [Level 2] Show positive and cooperative attitudes at work, promote a favorable image of the company, adapt to changes in the work structure and procedures, be sensitive and support the ideas and suggestions of others, be trustworthy and responsible. [Level 1] Maintain a respectful relationship with peers and superiors show a willingness to listen to others without interrupting, respect the rights of others, and respect internal regulations regarding scheduling, work clothes, and security.
Michigan Employability Skills	Personal management skills: Attends school/work daily and on time, meets school/work deadlines, pays attention to details.
New York State Education Department	Expanded basics: Demonstrates personal work skills and behaviors.

*O*NET*	Selective attention: The ability to concentrate and not be distracted while performing a task over a period of time. Attention to detail: Job requires being careful about detail and thorough in completing job tasks. Dependability: Job requires being reliable, responsible, and dependable, and fulfilling obligations. Stress tolerance: Job requires accepting criticism and dealing calmly and effectively with high stress situations. Cooperation: Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude. Initiative: Job requires being willing to take on responsibilities and challenges. Energy: Job requires the energy and stamina to accomplish work tasks. Persistence: Job requires persistence in the face of obstacles on the job.
Quality of American High School Graduates	Among skills important to employers surveyed: Is dependable; comes to work regularly and on time; exhibits a proper attitude about work and supervision.
Skill Demand, Changing Work Organization, and Performance	Personal qualities: Exhibits responsibility.
Survey of San Francisco Employers	Among desirable characteristics identified by employers: Seems serious about work and eager to get the job; seems bright and alert.
Vocational-Technical Consortium of States (VTECS)/Illinois	Maintaining professionalism: Participates in employment orientation in a positive and constructive manner, demonstrates knowledge of the company's image and products/services, exhibits positive behavior, participates in meetings in a positive and constructive manner, complies with organizational expectations. Demonstrating work ethics and behavior: Implements responsibilities of job position; follows rules, regulations, and policies; practices cost effectiveness; practices time management; assumes responsibility for personal decisions and actions; exhibits pride; displays initiative and assertiveness; and seeks work challenges.
Washington Workplace Competency Worksheet	Responsibility: Exerts a high level of effort and perseverance toward goal achievement, organizes time and materials, works hard to become proficient by setting high standards, pays attention to detail, displays a high level of concentration, values attendance and punctuality, displays enthusiasm, vitality, and optimism in approaching and completing tasks, values diversity, respects differences in point of view and life-style, understands the benefits of negotiation, and identifies personal work values and goals. Personal qualities: Demonstrates individual responsibility.

Workforce LA	Work ethic and workplace expectation skills: Demonstrates self-discipline, attends work regularly, and is punctual.
Workplace Basics (Carnevale)	Influence: Organizational effectiveness/leadership: The ability to make a positive impact on an organization and others.

SCANS Scales:

SCANS Scale Rationale:

Proactive

↑

Reactive

Level 4	Exerts a high and consistent level of effort and perseverance toward goal attainment. Works to become excellent at doing tasks by setting high standards, paying attention to details, and displaying a high level of concentration even when assigned an unpleasant task.
Level 3	Accepts responsibility and consequences across work unit or level. Shows initiative for achieving goals. Applies the extra effort necessary for accomplishing a task.
Level 2	Acknowledges and accepts responsibility and consequences for self. Shows initiative and applies a consistent level of effort to achieve organizational goals. Keeps supervisor informed.
Level 1	Displays the minimum standards of the workplace for attendance, punctuality, proper attitude, and focus on task. Knows which responsibilities or problems should be referred to supervisor.

SCANS—O*NET Crosswalk:

Comments: SCANS Personal Qualities are not covered in the Worker Requirements framework of O*NET, which is the framework used for this crosswalk. Yet, under O*NET Worker Characteristics, many of these attributes are defined.

Other O*NET Links:

The O*NET framework contains other references to responsibility. These include:

Selective attention (Worker Characteristics): The ability to concentrate and not be distracted while performing a task over a period of time.

Attention to detail (Worker Characteristics): Job requires being careful about detail and thorough in completing job tasks.

Dependability (Worker Characteristics): Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Stress tolerance (Worker Characteristics): Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Cooperation (Worker Characteristics): Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Initiative (Worker Characteristics): Job requires being willing to take on responsibilities and challenges.

Energy (Worker Characteristics): Job requires the energy and stamina to accomplish work tasks.

Persistence (Worker Characteristics): Job requires persistence in the face of obstacles on the job.

Assessments:

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning **Responsibility** Self-esteem Social Self-management Integrity/Honesty

FOUNDATION SKILLS: Personal Qualities

Self-Esteem

SCANS Definition: Believes in own self-worth and maintains a positive view of self, demonstrates knowledge of own skills and abilities, is aware of impact on others, and knows own emotional capacity and needs and how to address them.

Panel Comments: The ability to know one's emotional capacity is not related to self-esteem in this context.

Other skills to include in the definition include: believes in worth of work accomplishments; *always* maintains a positive view of self and the quality of work contribution (i.e., takes pride); and demonstrates an awareness of own skills and abilities.

Summary of Literature Review: Ten sources, listed below, were found to include some aspect of the quality "self-esteem" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition of self-esteem. However, several sources include the behaviors of taking risks and taking pride in accomplishments. The characteristics of integrity and a realistic and positive attitude are also mentioned. In addition, several sources indicated that self-esteem should be reflected in behavior.

List of Sources:

California Career-Technical Assessment Project (CTAP)	Personal skills: Exhibits a positive attitude; is self-confident.
Employer's Choice	Presents a positive image: Exhibits self-confidence.
Equipped for the Future	Knowledge domains: Includes knowledge about physical and intellectual growth as well as spiritual and psychological development. Linked to this domain is an understanding of personal qualities such as persistence, initiative, dependability, integrity, and self-confidence.
High Schools and the Changing Workplace: the Employer's View	Personal work habits: Possesses a realistic, positive attitude toward self; a positive attitude toward work and pride in accomplishment.
Job Skills for the 21st Century	Personal qualities: Self-esteem.

Kentucky Council on School Performance Standards	Personal attributes of self-sufficient individual: Possesses a positive academic self-concept.
Training America: Strategies for the Nation	Among skills identified by employers: Has self-esteem.
Washington Workplace Competency Worksheet	Self-esteem: Believes in self-worth and maintains a positive view, demonstrates knowledge of own skills and abilities, knows own emotional capacity and needs and how to address them, understands how one's self-esteem affects performance, can learn from the mistakes of others, accepts praise and criticism, states personal needs clearly, channels emotional reactions constructively, takes risks, and demonstrates friendliness, adaptability, empathy, and politeness in new and ongoing groups.
Workplace Basics (Carnevale)	Self-esteem, goal-setting/motivation, employability, career development. The most productive workers are those who have a strong positive belief in their abilities.
Young People's Participation in Post-Compulsory Education and Training	Personal and interpersonal: Exhibits self-esteem.

SCANS Scales:

SCANS Scale Rationale:

High level of self-awareness
↑
Minimum level of self-awareness

Level 4	Presents ideas even if they contradict the ideas of peers. Can separate constructive criticism of work from personal criticism. Seeks to improve oneself based on awareness of shortcomings.
Level 3	Presents own ideas to peers with confidence. Demonstrates full awareness of impact on others. Shows positive attitude at work. Has realistic knowledge of own shortcomings.
Level 2	Demonstrates minimum awareness of one's impact on others. Has realistic knowledge of own skills and abilities. Takes pride in level of effort and quality of accomplishments.
Level 1	Demonstrates a minimum awareness of own skills and abilities.

SCANS—O*NET Crosswalk: **Comments:** SCANS Personal Qualities are not covered in the Worker Requirements framework of O*NET, which is the framework used for this crosswalk. Yet, under O*NET Worker Characteristics, many of these attributes are defined.

Other O*NET Links: The O*NET framework does not contains a references to self-esteem.

Assessments:

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility **Self-esteem** Social Self-management Integrity/Honesty

FOUNDATION SKILLS: Personal Qualities

Social

SCANS Definition: Demonstrates understanding, friendliness, adaptability, empathy, and politeness in new and on-going group settings; asserts self in familiar and unfamiliar social situations; relates well to others; responds appropriately as the situation requires; and takes an interest in what others say and do.

Panel Comments: Other skills to include in the definition include: tolerates the humor of others; tolerates diverse cultures; and displays sense of humor.

Summary of Literature Review: Twenty-eight sources, listed below, were found to include some aspect of the quality "social" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition of social. However, several sources include the behaviors of interacting, involving others, handling stress, behaving in a socially appropriate manner, respecting the rights and property of others, handling conflict maturely, expressing opinions with tact, and controlling emotional responses. The characteristics of flexibility, cooperation, patience, tolerance, and a sense of humor were also included.

List of Sources:

AccuVision Workplace Success Skills System	Interacting with others: Interacts with others in a polite and effective manner (e.g., encourages cooperation, responds to others in a non-defensive manner, avoids personal criticisms). Asks others for their views and opinions (e.g., attempts to involve others in problem-solving activities, bounces ideas off of people and asks for feedback). Demonstrates a concern about problems and issues voiced by others (e.g., avoids an 'it's not my job' position, encourages others to provide feedback on their performance and/or ways they could improve).
ASTD Update: Basic Skills	Group and organizational effectiveness skills: Demonstrates interpersonal skills.
Australia's Key Competencies	Working with others and in teams: Interacts effectively with other people both on a one-to-one basis and in groups.
Bottom Line: Basic Skills in the Workplace	Among skills identified by small and medium-sized firms: Respects the rights of others.
Colorado Department of Education	Interpersonal skills: Exhibits openness and flexibility; exercises patience and tolerance; expresses opinions with tact; demonstrates a good sense of humor; respects the rights and property of others.

Consensus Framework for Workplace Readiness	Communication: Receives and uses both positive and negative feedback. Interpersonal: Respects the dignity of others; understands differences of opinion.
Employability Inventory	Among skills in the profile of ideal employee: Is skilled in interpersonal situations (maintains good relations with co-workers); is skilled in interpersonal situations (maintains good relations with supervisors, e.g., is loyal, honest, respectful).
Employer's Choice	Exhibits positive work attitudes: Uses basic social skills, respects property.
Future Work	Positive skills or attributes: Demonstrates interpersonal perception ability.
Getting a Job after College	Functional skills: Demonstrates interpersonal skills. Adaptive skills: Demonstrates tactfulness.
High School Curriculum Study	Among skills identified by survey results: Gets along with other people.
High Schools and the Changing Workplace: The Employer's View	Interpersonal relationships: Interacts in a socially appropriate manner; demonstrates respect for the opinions, customs, and individual differences of others; appreciates the importance and value of humor; offers and accepts criticism constructively; handles conflict maturely; and participates in reaching group decisions.
Investing in Our Children	Among skills identified by small companies: Works well with others.
Job Skills for the 21st Century	People skills: Social.
Kansas Business Survey	Among skills identified by surveyed businesses: Demonstrates interpersonal relations skills.
Kansas Competency Index of Workplace Skills	Self-management: Adjusts to unanticipated situations in the workplace. Work ethics: Exhibits cooperation and friendliness. Learning strategies: Uses peer support.

Kentucky Council on School Performance Standards	Social attributes of a responsible member of a family, work group, or community: Possesses interpersonal skills and team member skills, displays consistent and responsive caring behavior.
Mexico's Occupational Analysis Study	Interpersonal/social skills: [Level 5] Practice leadership and motivation to perform negotiation, persuasion, and promotion to achieve the desired goals, get and keep the confidence of those with whom they interact, promote the professional and personal development of peers and subordinates. [Level 4] Respond adequately to diverse situations, accept personal doubts and criticism of their work with maturity, adapt, easily, to different socio-cultural characteristics, and resolve interpersonnel conflicts in the workplace. [Level 3] Understand the diversity of opinions within a group, and coordinate and propitiates a joint effort toward the achievement of objectives. [Level 2] Show positive and cooperative attitudes at work, promote a favorable image of the company, adapt to changes in the work structure and procedures, be sensitive and support the ideas and suggestions of others, be trustworthy and responsible. [Level 1] Maintain a respectful relationship with peers and superiors show a willingness to listen to others without interrupting, respect the rights of others, and respect internal regulations regarding scheduling, work clothes, and security.
National Vocational Qualifications (NVQ)	Demonstrates personal skills.
New York State Education Department	Expanded basics: Possesses interpersonal skills.
New Zealand's Essential Skills	Social skills.
*O*NET*	Concern for others: Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job. Social orientation: Job requires preferring to work with others rather than alone and being personally connected with others on the job. Social perceptiveness: Being aware of others' reactions and understanding why they react the way they do. Coordination: Adjusting actions in relations to others' actions Establishing and maintaining interpersonal relationships: Developing constructive and cooperative working relationships with others. Assisting and caring for others: Providing assistance or personal care to others.
Project BEL	Among skills identified by surveyed employers: Possesses interpersonal skills.

Skill Demand, Changing Work Organization, and Performance	Workplace competencies: Is able to work with others.
Survey of San Francisco Employers	Among desirable characteristics identified by employers: Seems courteous and personable.
Vocational-Technical Consortium of States (VTECS)/Illinois	Maintaining professionalism: Exhibits courtesy, respects the jobs of other workers, and treats people with respect. Maintaining interpersonal relationships: Values individual diversity, responds appropriately to praise and criticism, provides constructive praise and criticism, constructively controls emotional responses, resolves conflict, displays a positive attitude, and identifies and reacts appropriately to sexual harassment.
Washington Workplace Competency Worksheet	Personal qualities: Demonstrates sociability; interacts with others; handles stress; copes with undesirable behavior in others.
Workforce LA	Basic skills: Demonstrates good interpersonal skills.

SCANS Scales:

SCANS Scale Rationale:

Reactive with high degree of interaction across different groups
↑
Proactive with limited interaction with different groups

Level 4	Fosters social interaction between others. Demonstrates understanding, friendliness, adaptability, empathy, humor, and poise in unfamiliar situations. Embraces diverse settings and individuals. Operates either within or outside formal organizational role.
Level 3	Demonstrates understanding, friendliness, adaptability, empathy, humor, and politeness in familiar situations, responding appropriately to diverse individuals from inside and outside the organization. Initiates conversation with unfamiliar people. Takes an interest in what others say and do.
Level 2	Interacts with others in the work environment who are equal to, below, and above them in status. Responds in an acceptable manner to invitations for interaction. Tolerates the humor of others and differences of opinion and ideas. Resolves disagreement through rational discussions
Level 1	Participates in a group setting without disrupting. Interacts with, listens to, and tolerates differences in others. Responds in an acceptable manner to social greetings and to the humor of others.

SCANS—O*NET Crosswalk:

Comments: SCANS Personal Qualities are not covered in the Worker Requirements framework of O*NET, which is the framework used for this crosswalk. Yet, under O*NET Worker Characteristics many of these attributes are defined.

Other O*NET Links:

The O*NET framework does contains other references to social. These include:

Concern for Others (Worker Characteristics): Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job.

Social Orientation (Worker Characteristics): Job requires preferring to work with others rather than alone and being personally connected with others on the job.

Social Perceptiveness (Worker Requirements): Being aware of others' reactions and understanding why they react the way they do.

Coordination (Worker Requirements): Adjusting actions in relations to others' actions

Establishing and Maintaining Interpersonal Relationships (Occupational Requirements): Developing constructive and cooperative working relationships with others.

Assisting and Caring for Others (Occupational Requirements): Providing assistance or personal care to others.

Assessments:

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem **Social** Self-management Integrity/Honesty

FOUNDATION SKILLS: Personal Qualities

Self-Management

SCANS Definition: Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and non-defensively; and is a self-starter.

Panel Comments: The definition should be related to a work context.

Other skills to include in the definition include: sets priorities; and works with multiple responsibilities.

Summary of Literature Review: Twenty-nine sources, listed below, were found to include some aspect of the quality "self-management" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition of self-management. However, several sources include the behaviors of initiating; setting priorities; monitoring; planning, organizing and structuring own work; managing time; setting realistic and attainable goals; and managing multiple responsibilities.

List of Sources:

AccuVision Workplace Success Skills System Interacting with others: Initiates action on problems; doesn't wait for someone else to do something; determines priorities (e.g., recognizes conflicting priorities, determines best way to schedule activities); structures own work (e.g., can determine best way to structure and plan a task for completion).

Arizona Workplace Skills Standards (Draft) Students apply principles of resource management and develop skills that promote personal and professional well-being, which includes setting and prioritizing a set of balanced goals related to school, home education, and career planning, and allocating sufficient time, materials, and resources to each task; and describing the importance of balancing home, school, and community activities to reduce stress.

Australia's Key Competencies Planning and organizing activities: Plans and organizes work activities, including making good use of time and resources, sorting out priorities and monitoring own performance.

Bottom Line: Basic Skills in the Workplace Among skills identified by small and medium-sized firms: Exhibits self-discipline.

California Career-Technical Assessment Project (CTAP)	Personal skills: Self-disciplined; manages time; balances priorities; demonstrates a capacity for lifelong learning.
Colorado Department of Education	Interpersonal skills: Shows initiative in getting work done. Self-discipline skills: Demonstrates self-control.
Consensus Framework for Workplace Readiness	Participate in the work organization: Assists the organization to set goals as well as the procedures to implement the goals; demonstrates initiative, motivation, and perseverance; manages personal resources; takes steps to achieve career goals; demonstrates self-motivated learning.
Employability Inventory	Among skills in the profile of ideal employee: Is emotionally stable (responds to stress in an appropriate fashion in the work environment).
Equipped for the Future	Common activities: Seeks out the support needed from others, examines, clarify and express your values, beliefs, culture, and history. Use your understanding of self to guide your actions. Examine, clarify and express your values, beliefs, culture, and history. Use your understanding of self to guide your actions. Establish a vision and goals. Use your vision and goals to identify, plan, and prioritize tasks and activities. Lifelong learning skills: Reflect on your own experiences, attitudes, and visions of the future. Assess your strengths, values, and opportunities for personal growth. Decision-making skills: Monitor and evaluate the effectiveness of what is done.
Future Work	Social management skills: Demonstrates long-range planning skills.
High Schools and the Changing Workplace: The Employer's View	Personal work habits: Sets goals and allocates time to achieve them.
Investing in Our Children	Among skills important for entry-level workers: Demonstrates self-discipline.
Job Skills for the 21st Century	Personal qualities: Self-management.
Kansas Business Survey	Among skills identified by surveyed businesses: Goal setting and personal motivation skills.

Kentucky Council on School Performance Standards	Personal attributes of self-sufficient individual: Is self-controlled and disciplined.
Mexico's Occupational Analysis Study	Coordination and administration of activities: [Level 5] Evaluates personnel, project, operations and programs; design programs; establish program goals and determine activities to meet goals; recommend and carry out solutions to problems as necessary. [Level 4] Coordinate activities, operations and personnel; administer resources; identify priorities and supervise activities. [Level 3] Schedule, plan, and organize activities; make estimates of resources needed for an operation or activity; explain procedures to others to carry out duties. [Level 2] Make phone calls or prepare correspondence to arrange appointments or meeting; guide activities of the public or co-workers; arrange for permits and authorizations; schedule own activities. [Level 1] Provide direct support for activities; prepare the work area or arranging for necessary materials for an activity. Interpersonal/social skills: [Level 5] Practice leadership and motivation to perform negotiation, persuasion, and promotion to achieve the desired goals, get and keep the confidence of those with whom they interact, promote the professional and personal development of peers and subordinates. [Level 4] Respond adequately to diverse situations, accept personal doubts and criticism of their work with maturity, adapt, easily, to different socio-cultural characteristics, and resolve inter-personnel conflicts in the workplace. [Level 3] Understand the diversity of opinions within a group, and coordinate and propitiates a joint effort toward the achievement of objectives. [Level 2] Show positive and cooperative attitudes at work, promote a favorable image of the company, adapt to changes in the work structure and procedures, be sensitive and support the ideas and suggestions of others, be trustworthy and responsible. [Level 1] Maintain a respectful relationship with peers and superiors show a willingness to listen to others without interrupting, respect the rights of others, and respect internal regulations regarding scheduling, work clothes, and security.
Michigan Employability Skills	Personal management skills: Knows personal strengths and weaknesses; demonstrates self-control; works without supervision.
New Standards Project	Planning and organizing resources: Incorporates strategic goals into planning and organization of own work; and incorporates criteria for quality and efficacy of outcome into planning and organization of won work; and incorporates goals, plans and priorities of strategic nature into planning and organization of own work.
New York State Education Department	Expanded basics: Sets priorities.
New Zealand's Essential Skills	Self-management skills.

*O*NET*	Achievement/effort: Job requires establishing and maintaining personally challenging achievement goals, and exerting effort toward task mastery. Self-control: Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior even in very difficult situations. Independence: Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done. Adaptability/Flexibility: Job requires being open to change (positive or negative) and to considerable variety in the workplace. Organizing, planning, and prioritizing work: Developing plans to accomplish work, and prioritizing and organizing one's own work.
Project BEL	Among skills identified by surveyed employers: Possesses self-awareness.
Skill Demand, Changing Work Organization, and Performance	Personal qualities: Exhibits self-management skills.
Survey of San Francisco Employers	Among desirable characteristics identified by employers: Shows a record of achievement in school.
Texas Workplace Skills Inventory	Among skills identified as essential: Manages one's time on tasks.
Training America: Strategies for the Nation	Among skills identified by employers: Exhibits personal management attributes; demonstrates goal-setting skills and motivation.
Washington Workplace Competency Worksheet	Self-management: Demonstrates the ability to assess own knowledge, skills, and abilities, sets realistic and attainable goals, monitors progress toward goals, is a self-starter, and manages anger. Personal qualities: Recognizes and improves capacities to judge and balance appropriate behavior, assumes responsibility for personal performance, shares responsibility, understands the need to handle multiple responsibilities.
Workplace Basics (Carnevale)	Set realistic and attainable goals, and are interested in career development and growth opportunities.

Young People's Participation in Post-Compulsory Education and Training

Personal and interpersonal: Demonstrates personal management skills.

SCANS Scales:

SCANS Scale Rationale:

High degree of autonomy

↑

Little degree of autonomy

Level 4	Sets priorities and works with multiple responsibilities. Shows initiative and is a self-starter. Develops realistic and measurable work and career goals. Motivates self through continuous goal-setting and monitors progress toward goals. Exhibits self-control and responds to positive and negative feedback unemotionally.
Level 3	Plans and schedules own work activities in order to complete assignments on time. Demonstrates self-control and self-discipline in the face of workplace conflicts. Monitors own knowledge, skills, and abilities accurately to continue career growth.
Level 2	Conducts work activities with an understanding of workplace goals and culture. For example, completes assigned work. Demonstrates self-control in workplace interactions.
Level 1	Responds appropriately to supervision. Self-monitors and knows when to seek help. Demonstrates self-control in familiar, nonconflicting workplace situations.

SCANS—O*NET Crosswalk:

Comments: SCANS Personal Qualities are not covered in the Worker Requirements framework of O*NET, which is the framework used for this crosswalk. Yet, under O*NET Worker Characteristics, many of these attributes are defined.

Other O*NET Links:

The O*NET framework does contains other references to self-management. These include:

Achievement/Effort (Worker Characteristics): Job requires establishing and maintaining personally challenging achievement goals, and exerting effort toward task mastery.

Self-Control (Worker Characteristics): Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior even in very difficult situations.

Independence (Worker Characteristics): Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

Adaptability/Flexibility (Worker Characteristics): Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Organizing, Planning, and Prioritizing Work (Occupational Requirements): Developing plans to accomplish work, and prioritizing and organizing one's own work.

Assessments:

Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social **Self-management** Integrity/Honesty

FOUNDATION SKILLS: Personal Qualities

Integrity/Honesty

SCANS Definition: Can be trusted, recognizes when faced with making a decision or exhibiting behavior that may break with commonly held personal or societal values, understands the impact of violating these beliefs and codes on an organization, self, and others, and chooses the ethical course of action.

Panel Comments: The reference to societal values should be dropped from the definition.

Summary of Literature Review: Thirteen sources, listed below, were found to include some aspect of the quality "integrity/honesty" as part of their definition of necessary workplace skills. In general, these sources support the SCANS definition for integrity/honesty.

List of Sources:

ASTD Update: Basic Skills	Personal reliability skills: Has ethics.
California Career-Technical Assessment Project (CTAP)	Personal skills: Honest.
Consensus Framework for Workplace Readiness	Personal management: Behaves with integrity.
Employer's Choice	Practices ethical behavior: Exercises integrity and good judgment.
Equipped for the Future	Knowledge domains: How individuals are shaped by family and community values, and the effects of values and ethics on law and government.
Future Work	Regulatory and enforcement skills: Demonstrates ethical thinking on decisions.
Kansas Competency Index of Workplace Skills	Work ethics: Exhibits integrity and honesty.

Kentucky Council on School Performance Standards	Personal attributes of self-sufficient individual: Is ethical.
*O*NET*	Integrity: Job requires being honest and avoiding unethical behavior.
Texas Workplace Skills Inventory	Among skills identified as essential: Exhibits trust/honesty.
Vocational-Technical Consortium of States (VTECS)/Illinois	Demonstrating work ethics and behavior: Applies ethical reasoning.
Washington Workplace Competency Worksheet	Personal qualities: Demonstrates integrity; understands the value of honesty.
Young People's Participation in Post-Compulsory Education and Training	Personal and interpersonal: Exhibits ethics.

SCANS Scales:

SCANS Scale Rationale:

Proactive
↑
Reactive

Level 4	Exhibits behaviors of honesty and integrity out of commitment to social ideals. Mentors others in issues of ethics and ethical behaviors. Operates in the spirit of the greater social good when fulfilling work and organizational responsibilities.
Level 3	Acts in accordance with the principles of civil law. Promotes ethical behaviors in others. Accepts and completes work responsibilities out of duty to the organization and its goals. Understands the consequences of social and personal issues (i.e., confidentiality) and chooses a course of action to the benefit and welfare of others.
Level 2	Abides by the rules of the workplace without being asked or directly supervised. Exhibits behaviors of honesty and integrity from personal sense of right and wrong. Completes personal work responsibilities out of personal sense of duty and pride in one's work.
Level 1	Conforms work behaviors to supervisory and peer culture expectations. Simulates behaviors of honesty and integrity in employment practices from observing the attitudes and behaviors of people with whom they have direct contact. Completes work responsibilities out of personal sense of duty to immediate co-workers or supervisor.

SCANS—O*NET Crosswalk:

Comments: SCANS Personal Qualities are not covered in the Worker Requirements framework of O*NET, which is the framework used for this crosswalk. Yet, under O*NET Worker Characteristics, many of these attributes are defined.

Other O*NET Links:

The O*NET framework does contains other references to integrity/honesty. These include:

Integrity (Worker Characteristics): Job requires being honest and avoiding unethical behavior.

Assessments:

Applicant Review (1996)	CHC Forecast Inc. 460 North University Avenue Suite *201* Provo, UT 84606 (801)373-5770	**Integrity/Honesty**
Industrial Psychology International, Ltd. -- Workplace Skills Survey	Industrial Psychology International, Ltd. (IPI) 4106 Fieldstone Road Champaign, IL 61822 (217)398-1437 (800)747-1119	Acquires and evaluates information Organizes and maintains information Interprets and communicates information Uses computers to process information Participates as a member of a team Teaches others Serves clients/customers Exercises leadership Negotiates to arrive at a decision Applies technology to task Writing Speaking Decision making Problem solving Reasoning Responsibility Self-esteem Social Self-management **Integrity/Honesty**
PDI Employment Inventory	Personnel Decisions, Inc. International Corporate Offices 2000 Plaza VII Tower 45 South Seventh Street Minneapolis, MN 55402-1608 (612)339-0927 (800)633-4410	**Integrity/Honesty**

BIBLIOGRAPHY

ACT, Inc. (1994). *Work Keys targets for instruction.* Iowa City, IA: ACT Publications.

AON Consulting (1997). *The 1997 survey of human resource trends report.* Detroit, MI: AON Consulting.

Arizona Workplace Skills Standards (Draft) (1996).

Askov, E.N. (1997). *Framework for developing skill standards for workplace literacy.* Washington, DC: National Institute for Literacy.

Baxter, M. and Young, J.L. (1980). *High school curriculum study.* Hattiesburg, MS: University of Southern Mississippi.

Bell County Network for Educational Technology. *Texas work place skills inventory.* (http://bellnetweb.brc.tamus.edu).

Cappelli, P. and Rogovsy, N. (1994). *Skill demand, changing work organization, and performance.* Philadelphia, PA: National Center on the Educational Quality of the Workforce, University of Pennsylvania.

Carnevale, A.P., Gainer, L.J., and Meltzer, A.S. (1990). *Workplace basics: The essential skills employers want.* San Francisco: Jossey-Bass.

Carnevale, A.P., Gainer, L.J., and Meltzer, A.S. (1988). *Workplace basics: The skills employers want.* American Society for Training and Development.

Center for Public Resources (1983). *Basic skills in the U.S. work force: The contrasting perceptions of business, labor, and public education.* New York: Center for Public Resources.

Chatham-Savannah Compact (1992).

Coates, J.F., Jarratt, J., and Mahaffie, J.B. (1990). *Future work.* San Francisco: Jossey-Bass, Inc.

Colorado Department of Education (1983).

Committee for Economic Development, Research and Policy Committee (1985). *Investing in our children: Business and the public schools: A statement.* Washington, DC: Committee for Economic Development.

CONOCER (1998). Mexico's Occupational Analysis Study.

Council of Chief State School Officers (1995). *Consensus framework for workplace readiness.* Presented at the CCSSO Workplace Readiness Assessment Consortium, July 1995.

Crain, R.F. (1984). *The quality of American high school graduates: What personnel officers say and do about it.* Baltimore: Johns Hopkins University, Center for Social Organization of Schools, Report No. 354, pp. 3-40.

Employability Skills Task Force (1988). *A Michigan employability profile: Report to the governor's commission on jobs and economic employment.*

Far West Laboratory for Educational Research and Development (1992). *California career-technical assessment project—Career performance standards.* San Francisco, CA.

BEST COPY AVAILABLE

Finn Committee (1991). Young People's Participation in Post-Compulsory Education and Training.

Geroy, G.D. and Erwin, M.G. (1988). Assessing literacy in the workplace. *Performance & Instruction*, May/June 1988, pp. 32-38.

Jones (1995). Job Skills for the 21st Century.

Kane, M., Fiske, E., Copple, C., and Cohen, J. (1992). *Developing schools that work—Fort Worth: Project C^3*. Washington, DC: Pelavin Associates, Inc.

Kansas Competency-Based Curriculum Center. *A competency index of workplace basic skills, occupational specific basic skills, and generalizable (basic) skills*. Topeka, KS: Washburn University.

Kentucky Council on School Performance Standards. (1989).

Lankard, B.A. (1987). *The employer's choice: In the job search*. Columbus, OH: National Center for Research in Vocational Education, Ohio State University.

Learning Resources, Inc. *AccuVision workplace success skills system*. (www.learning-resources.com/wss12.htm).

Michigan State Board of Education (1993). *Employability skills assessment kit version 1.0*. East Lansing, MI: Michigan State University.

Moore, N.K., Shaffer, M.T., and Seifert, R.F. (1985). Basic skill requirements for selected army occupational training courses. *Contemporary Educational Psychology* 10: 83-92.

Murnane, R.J. and Levy, F. (1996). *Teaching the new basic skills: Principles for educating children to thrive in a changing economy*. New York: Free Press.

Murphy, C. and Jenks, L. (1983). Getting a job after college—What skills are needed? *Journal of Career Education* 10: 80-93.

National Alliance of Business (1987). *The fourth R: Workforce readiness*.

National Center on Education and the Economy and American Society for Training and Development (1989). *Training America: Strategies for the nation*.

National Institute for Literacy. *Equipped for the future*. Washington, DC: National Institute for Literacy.

National Vocational Qualifications (NVQ).

New Standards Project (1993). *The new standards applied learning framework* (discussion draft). Washington, DC: New Standards Project.

New Zealand's Essential Skills.

Panel on Secondary School Education for the Changing Workplace, National Academy of Sciences, and Committee on Science, Engineering, and Public Policy (1984). *High schools and the changing workplace: The employer's view*. Washington, DC: National Academy Press.

Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor. (1991). *Skills and tasks for jobs: A SCANS report for America 2000.* Washington, DC: U.S. Government Printing Office.

State Board for Community and Technical Colleges, Office of the State Superintendent of Public Instruction, Association of Washington Business, and State Labor Council. *Washington workplace competency worksheet.*

Survey of San Francisco Employers (1983).

The Australian Education Council and Ministers for Vocational Education, Employment, and Training (1992). *Putting general education to work: The key competencies report.* Australia: Sands & McDougall Printing.

The Chamber of Commerce and National Association of Manufacturers' Survey.

The University of the State of New York and The State Education Department (1991). *A new compact for learning.*

TRO Learning. *The PLATO learning system.* (www.tro.com).

U.S. Department of Labor and U.S. Department of Education (1988). *The bottom line: Basic skills in the workplace.*

University of Kansas (1989). Kansas Business Survey.

Vocational Technical Consortium of States, The State of Illinois Initiate (1992). *Workplace skills: Discover a future that works.* Decatur, GA: V-TECS.

Washington Basic Skills.

Wilms (1983). Survey of Employers in Los Angeles and Torrence, California.

Wilson, M.J., Engels, D., Hartz, J.D., and Foster, D.E. (1978). The employability inventory. *Journal of Employment Counseling* 24(2): 62-68.

Workforce Development Region IX (1997). *Regional advisory board needs assessment survey report.*

Workforce LA (1990).

Young, J.L. What competencies do employees really need? A review of three studies. *Journal of Career Development.* March 1986, pp. 240-249.

Appendix A

Summary of Sources

SCANS

SCANS, which convened in 1990 at the request of the Secretary of Labor, developed a taxonomy of higher-order workplace foundation skills and competencies. The development process included reviewing existing skill lists and interviewing 200 workers, approximately four in each of 50 occupations, to determine the application of the taxonomy elements to their jobs. The taxonomy is anchored by Foundation Skills, which include basic skills (reading, writing, and math), higher-order thinking skills, and personal qualities. The five Competency and three Foundation Skill areas, with illustrative behaviors, are presented below.

COMPETENCIES	Resources
Allocates Time	Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules. Demonstrating competence includes properly identifying tasks to be completed; ranking them in order of importance; developing and following an effective, workable schedule based on accurate estimates of such things of importance as tasks, time to complete tasks, time available for completion, and task deadline; avoiding wasting time; and accurately evaluating and adjusting a schedule.
Allocates Money	Prepares budgets, makes cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments. Demonstrating competence includes accurately preparing and using a budget consistent with accounting methods, accurately calculating future budgetary needs based on projected costs and revenues, accurately tracking the extent to which actual costs and revenues differ from the estimated budget, and taking appropriate and effective actions.
Allocates Material and Facility Resources	Acquires, stores, and distributes materials, supplies, parts, and equipment, space, or final products to make the best use of them. Demonstrating competence includes carefully planning the steps involved in the acquisition, storage, and distribution of resources; safely and efficiently acquiring, transporting, or storing them; maintaining them in good condition; and distributing them to the end user.
Allocates Human Resources	Assesses knowledge and skills and distributes work accordingly, evaluates performance and provides feedback. Demonstrating competence includes accurately assessing an individual's knowledge, skills, abilities, and potential; identifying present and future workloads; making effective matches between individual talents and workload; and actively monitoring performance and supplying feedback.

COMPETENCIES	Information
Acquires and Evaluates Information	Identifies need for data, obtains them from existing sources or creates them, and evaluates their relevance and accuracy. Demonstrating competence includes posing analytic questions to determine specific need for information, selecting possible information and evaluating its appropriateness, and determining a need for new information.
Organizes and Maintains Information	Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion. Demonstrating competence includes understanding and organizing information from computer, visual, oral, and physical sources in readily accessible formats (e.g., computerized databases, spreadsheets, microfiche, videodiscs, paper files); and transforming data into different formats to organize them by the application of sorting, classifying, or more formal methods.
Interprets and Communicates Information	Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multimedia methods. Demonstrating competence includes determining the information to be communicated, identifying the best methods to present the information (e.g., overheads, handouts), and converting the information to a desired format when conveying it to others (e.g., oral, written).
Uses Computers to Process Information	Employs a computer to acquire, organize, analyze, and communicate information. Demonstrating competence includes entering, modifying, retrieving, storing, and verifying data and other information; choosing a format for displaying information (e.g., line graph, bar graph, tables, pie charts, narrative); and ensuring the accurate conversion of information into a chosen format.

COMPETENCIES	Interpersonal
Participates as a Member of a Team	Works cooperatively with others and contributes to a group with ideas, suggestions, and effort. Demonstrating competence includes doing one's own share of tasks necessary to complete a project, encouraging team members by listening and responding appropriately to their contributions, building on individual team members' strengths, resolving differences for the benefit of the team, taking personal responsibility for accomplishing goals, and responsibly challenging existing procedures, policies, or authorities.

Teaches Others	Helps others to learn.Demonstrating competence includes assisting others in applying related concepts and theories to tasks through coaching or other means, identifying training needs, conveying job information in an effort to allow others to see its applicability and relevance to tasks, and assessing performance and providing constructive feedback and reinforcement.
Serves Clients/Customers	Works and communicates with clients and customers to satisfy their expectations. Demonstrating competence includes actively listening to customers to identify needs and avoid misunderstandings, communicating in a positive manner, especially when handling complaints or conflict; and efficiently obtaining additional resources to satisfy client needs.
Exercises Leadership	Communicates thoughts, feelings, and ideas to justify a position, encourage, persuade, convince, or otherwise motivate an individual or group, which includes responsibly challenging existing procedures, policies, or authority. Demonstrating competence includes making positive use of rules/values followed by others, justifying a position logically and appropriately, establishing credibility through competence and integrity, and taking minority viewpoints into consideration.
Negotiates to Arrive at a Decision	Works toward an agreement that may involve exchanging specific resources or resolving divergent interests. Demonstrating competence includes resolving conflicts, adjusting quickly to new facts/ideas, proposing and examining possible options, and making reasonable compromises.
Works with Cultural Diversity	Works well with others regardless of gender, ethnic, social, and/or educational differences/similarities. Demonstrating competence includes understanding one's own culture, that of others, and how they may differ; respecting the rights of others while helping them to make cultural adjustments when necessary; avoiding the use of stereotypes and bias; and being understanding of the concerns of members of other ethnic and gender groups.
COMPETENCIES	**Systems**
Understands Systems	Knows how social, organizational, and technological systems work and operate. Demonstrating competence includes understanding how a system's structure relates to goals, responding to the demands of the systems/organization, knowing the right people to ask for information and where to get resources, and understanding how to function within the formal and informal codes of the social/organizational system.

Monitors and Corrects Performance	Distinguishes trends and predicts the impact of actions on system operations, diagnoses deviations in the function of the system/organization, and takes the necessary action to correct performance. Demonstrating competence includes identifying trends and gathering needed information about how the system is intended to function, detecting deviations from the system's intended purpose, troubleshooting the system, and making changes to rectify the system function and to ensure product quality.
Improves and Designs Systems	Makes suggestions to modify existing systems to improve products and services and develops new or alternative systems. Demonstrating competence includes making suggestions and recommending alternative system designs based on relevant feedback, and responsibly challenging the status quo to benefit the larger system.

COMPETENCIES	Technology
Selects Technology	Judges which set of procedures, tools, machines, and computers will produce the desired results. Demonstrating competence includes determining desired outcomes and applicable constraints, visualizing the necessary methods and applicable technology, evaluating specifications, and judging which machine or tool will produce the desired results.
Applies Technology to Task	Understands the overall intent and proper procedures for setting up and operating machines, including computers and their programming systems. Demonstrating competence includes understanding how different parts of machines interact and how machines interact with broader production systems, installing machines including computers, setting up machines or systems of machines, and accurately interpreting machine output to include errors from program output.
Maintains and Troubleshoots Technology	Prevents, identifies, or solves problems in machines, computers, and other technology. Demonstrating competence includes understanding, identifying, and performing routine preventive maintenance and service on technology, detecting more serious problems, generating workable solutions to correct problems, and recognizing when additional help is needed.

FOUNDATION SKILLS	Basic Skills
Reading	Locates, understands, and interprets written information in prose and documents, including manuals, graphs, and schedules; learns from text by determining the main idea or essential message; identifies relevant details, facts, and specifications; infers or

	locates the meaning of unknown or technical vocabulary; judges the accuracy, appropriateness, style, and plausibility of reports, proposals, and theories of other writers.
Writing	Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately, composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, and flowcharts; uses language, style, organization, and format appropriate to the subject matter, purpose, and audience; includes supporting documentation, and attends to level of emphasis, form, grammar, spelling, and punctuation.
Arithmetic	Performs basic computations, uses basic numerical concepts such as whole numbers and percentages in practical situations, makes reasonable estimates of arithmetic results without a calculator, and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information.
Mathematics	Approaches practical problems by choosing appropriately from a variety of mathematical techniques, uses quantitative data to construct logical explanations for real-world situations, expresses mathematical ideas and concepts orally and in writing, and understands the role of chance in the occurrence and prediction of events.
Listening	Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose (e.g., comprehend, learn, critically evaluate, appreciate, or support a speaker).
Speaking	Organizes ideas and communicates oral messages appropriate to listeners and situations; participates in conversation, discussion, and group presentations; selects an appropriate medium for conveying a message; uses verbal language and other cues such as body language appropriate in style, tone, and level of complexity to the audience and occasion; speaks clearly and communicates a message; understands and responds to listener feedback; and asks questions as necessary.

FOUNDATION SKILLS	**Thinking Skills**
Creative Thinking	Uses imagination freely, combines ideas or information in new ways, makes connections between seemingly unrelated ideas, and reshapes goals in ways that reveal new possibilities.

Decision Making	Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses the best alternative.
Problem Solving	Recognizes that a problem exists, identifies possible reasons for the discrepancy, devises and implements a plan of action to resolve it, evaluates and monitors progress, and revises plans as revealed by findings.
Seeing Things in the Mind's Eye	Organizes and processes symbols, pictures, graphs, objects, or other information (e.g., sees a building from a blueprint, a system's operation from schematics, and the flow of work activities from narrative descriptions).
Knowing How to Learn	Recognizes and can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations, and is aware of learning tools such as personal learning styles (e.g., visual, aural) and formal and informal learning strategies.
Reasoning	Discovers rules or principles underlying the relationship between two or more objects and applies it in solving a problem, uses logic to draw conclusions from available information, extracts rules or principles from a set of objects or written text, applies rules and principles to a new situation or determines which conclusions are correct when given a set of facts and a set of conclusions.

FOUNDATION SKILLS	Personal Qualities
Responsibility	Exerts a high level of effort and perseverance toward goal attainment; works hard to become excellent at doing tasks by setting high standards, paying attention to details, working well, and displaying a high level of concentration even when assigned an unpleasant task; displays high standards of attendance, punctuality, enthusiasm, vitality, and optimism in approaching and completing tasks.
Self-Esteem	Believes in own self-worth and maintains a positive view of self, demonstrates knowledge of own skills and abilities, is aware of impact on others, and knows own emotional capacity and needs and how to address them.
Social	Demonstrates understanding, friendliness, adaptability, empathy, and politeness in new and on-going group settings; asserts self in familiar and unfamiliar social situations; relates well to others; responds appropriately as the situation requires; and takes an interest in what others say and do.

Self-Management	Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and non-defensively; and is a self-starter.
Integrity/Honesty	Can be trusted, recognizes when faced with making a decision or exhibiting behavior that may break with commonly held personal or societal values, understands the impact of violating these beliefs and codes on an organization, self, and others, and chooses the ethical course of action.

O*NET

O*NET, the Occupational Information Network, is a comprehensive database system for collecting, organizing, describing, and disseminating data on job characteristics and worker attributes. O*NET, which is sponsored by the U.S. Department of Labor's Employment and Training Administration, replaces the outmoded *Dictionary of Occupational Titles (DOT)*. O*NET provides a new conceptual framework that reflects the advanced technologies, adaptable workplace structures, and wide-ranging skills required by today's changing workplace.

The O*NET database contains hundreds of information units on job requirements, worker attributes, and the content and context of work. The data is classified into six domains: Worker Characteristics, Worker Requirements, Experience Requirements, Occupational Requirements, Occupation-Specific, and Occupational Characteristics. Because the O*NET database is so large, all the categories are listed here but they only provide detail on those skills that are similar to the SCANS competencies and foundation skills.

WORKER CHARACTERISTICS	Abilities: Cognitive Abilities
Verbal Abilities	***Oral Comprehension***: The ability to listen to and understand information and ideas presented through spoken words and sentences. ***Written Comprehension***: The ability to read and understand information and ideas presented in writing. ***Oral Expression***: The ability to communicate information and ideas in speaking so others will understand. ***Written Expression***: The ability to communicate information and ideas in writing so others will understand.
Idea Generation and Reasoning Abilities	***Fluency of Ideas***: The ability to come up with a number of ideas about a given topic. It concerns the number of ideas produced and not the quality, correctness, or creativity of the ideas. ***Originality***: The ability to come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.

	Problem Sensitivity: The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
	Deductive Reasoning: The ability to apply general rules to specific problems to come up with logical answers. It involves deciding if an answer makes sense.
	Inductive Reasoning: The ability to combine separate pieces of information, or specific answers to problems, to form general rules or conclusions. It includes coming up with a logical explanation for why a series of seemingly unrelated events occur together.
	Information Ordering: The ability to correctly follow a given rule or set of rules in order to arrange things or actions in a certain order. The things or actions can include numbers, letters, words, pictures, procedures, sentences, and mathematical or logical operations.
	Category Flexibility: The ability to produce many rules so that each rule tells how to group (or combine) a set of things in a different way.
Quantitative Abilities	***Mathematical Reasoning***: The ability to understand and organize a problem and then to select a mathematical method or formula to solve the problem.
	Number Facility: The ability to add, subtract, multiply, or divide quickly and correctly.
Memory	***Memorization***: The ability to remember information such as words, numbers, pictures, and procedures.
Perceptual Abilities	***Speed of Closure***: The ability to quickly make sense of information that seems to be without meaning or organization. It involves quickly combining and organizing different pieces of information into a meaningful pattern.
	Flexibility of Closure: The ability to identify or detect a known pattern (a figure, object, word, or sound) that is hidden in other distracting material.
	Perceptual Speed: The ability to quickly and accurately compare letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.
Spatial Abilities	***Spatial Orientation***: The ability to know one's location in relation to the environment, or to know where other objects are in relation to oneself.
	Visualization: The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.

Attentiveness	***Selective Attention***: The ability to concentrate and not be distracted while performing a task over a period of time. ***Time Sharing***: The ability to efficiently shift back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources).
Psychomotor Abilities	
Physical Abilities	
Sensory Abilities	

WORKER CHARACTERISTICS	Interests

WORKER CHARACTERISTICS	Work Styles
Achievement Orientation	***Achievement/Effort:*** Job requires establishing and maintaining personally challenging achievement goals, and exerting effort toward task mastery. ***Persistence:*** Job requires persistence in the face of obstacles on the job. ***Initiative:*** Job requires being willing to take on responsibilities and challenges.
Social Influence	***Energy:*** Job requires the energy and stamina to accomplish work tasks. ***Leadership Orientation:*** Job requires a willingness to lead, take charge, and offer opinions and direction.
Interpersonal Orientation	***Cooperation:*** Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude. ***Concern for Others:*** Job requires being sensitive to others' needs and feelings, and being understanding and helpful to others on the job. ***Social Orientation:*** Job requires preferring to work with others rather than alone and being personally connected with others on the job.
Adjustment	***Self-Control:*** Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior even in very difficult situations. ***Stress Tolerance:*** Job requires accepting criticism and dealing calmly and effectively with high-stress situations. ***Adaptability/Flexibility:*** Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Conscientiousness	*Dependability:* Job requires being reliable, responsible, and dependable, and fulfilling obligations. *Attention to Detail:* Job requires being careful about detail and thorough in completing work tasks. *Integrity:* Job requires being honest and avoiding unethical behavior.
Independence	Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.
Practical Intelligence	*Innovation:* Job requires creativity and alternative thinking to come up with new ideas for and answers to work-related problems. *Analytical Thinking:* Job requires analyzing information, and using logic to address work or job issues and problems.

WORKER REQUIREMENTS	Basic Skills
Content	*Reading Comprehension:* Understanding written sentences and paragraphs in work-related documents. *Active Listening:* Listening to what other people are saying and asking questions as appropriate. *Writing:* Communicating effectively with others in writing as indicated by the needs of the audience. *Speaking:* Talking to others to effectively convey information. *Mathematics:* Using mathematics to solve problems. *Science:* Using scientific methods to solve problems.
Process	*Critical Thinking:* Using logic and analysis to identify the strengths and weaknesses of different approaches. *Active Learning:* Working with new material or information to grasp its implications. *Learning Strategies:* Using multiple approaches when learning or teaching new things. *Monitoring:* Assessing how well one is doing when learning or doing something.

WORKER REQUIREMENTS	Cross-Functional Skills
Social Skills	*Social Perceptiveness:* Being aware of others' reactions and understanding why they react the way they do. *Coordination:* Adjusting actions in relation to others' actions. *Persuasion:* Persuading others to approach things differently.

	Negotiation: Bringing others together and trying to reconcile differences. ***Instructing:*** Teaching others how to do something. ***Service Orientation:*** Actively looking for ways to help people.
Complex Problem Solving Skills	***Problem Identification:*** Identifying the nature of problems. ***Information Gathering:*** Knowing how to find information and identifying essential information. ***Information Organization:*** Finding ways to structure or classify multiple pieces of information. ***Synthesis/Reorganization:*** Reorganizing information to get a better approach to problems or tasks. ***Idea Generation:*** Generating a number of different approaches to problems. ***Idea Evaluation:*** Evaluating the likely success of an idea in relation to the demands of the situation. ***Implementation Planning:*** Developing approaches for implementing an idea. ***Solution Appraisal:*** Observing and evaluating the outcomes of a problem solution to identify lessons learned or redirect efforts.
Technical Skills	***Operations Analysis:*** Analyzing needs and product requirements to create a design. ***Technology Design:*** Generating or adapting equipment and technology to serve user needs. ***Equipment Selection:*** Determining the kind of tools and equipment needed to do a job. ***Installation:*** Installing equipment, machines, wiring, or programs to meet specifications. ***Programming:*** Writes computer programs for various purposes. ***Testing:*** Conducting tests to determine whether equipment, software, or procedures are operating as expected. ***Operation Monitoring:*** Watching gauges, dials, or other indicators to make sure a machine is working properly. ***Operation and Control:*** Controlling operations of equipment or systems. ***Product Inspection:*** Inspecting and evaluating the quality of products. ***Equipment Maintenance:*** Performing routine maintenance and determining when and what kind of maintenance is needed. ***Troubleshooting:*** Determining what is causing an operating error and deciding what to do about it. ***Repairing:*** Repairing machines or systems using the needed tools.

Systems Skills	***Visioning:*** Developing an image of how a system should work under ideal conditions. ***Systems Perception:*** Determining when important changes have occurred in a system or are likely to occur. ***Identification of Downstream Consequences:*** Determining the long-term outcomes of a change in operations. ***Identification of Key Causes:*** Identifying the things that must be changed to achieve a goal. ***Judgment and Decision Making:*** Weighing the relative costs and benefits of a potential action. ***Systems Evaluation:*** Looking at many indicators of system performance, taking into account their accuracy.
Resource Management Skills	***Time Management:*** Managing one's own time and the time of others. ***Management of Financial Resources:*** Determining how money will be spent to get the work done, and accounting for these expenditures. ***Management of Material Resources:*** Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work. ***Management of Personnel Resources:*** Motivating, developing, and directing people as they work, identifying the best people for the job.

WORKER REQUIREMENTS

Knowledge

WORKER REQUIREMENTS

Education

EXPERIENCE REQUIREMENTS

Experience and Training

EXPERIENCE REQUIREMENTS

Licensing

OCCUPATIONAL REQUIREMENTS

Generalized Work Activities

Information Input	***Looking for and Receiving Job-Related Information*** *Getting Information Needed to Do the Job:* Observing, receiving, and otherwise obtaining information from all relevant sources.

Monitoring Processes, Materials, or Surroundings: Monitoring and reviewing information from materials, events, or the environment, often to detect problems or to find out when things are finished.

Identifying/Evaluating Job-Relevant Information

Identifying Objects, Actions, and Events: Identifying information received by making estimates or categorizations, recognizing differences or similarities, or sensing changes in circumstances or events.

Inspecting Equipment, Structures, or Materials: Inspecting or diagnosing equipment, structures, or materials to identify the causes of errors or other problems or defects.

Estimating the Characteristics of Materials, Products, Events, or Information: Estimating sizes, distances, and quantities, or determining time, costs, resources, or materials needed to perform a work activity.

Mental Processes

Information/Data Processing

Judging the Qualities of Objects, Services, or Persons: Making judgments about or assessing the value, importance, or quality of things or people.

Processing Information: Compiling, coding, categorizing, calculating, tabulating, auditing, verifying, or processing information or data.

Evaluating Information for Compliance to Standards: Evaluating information against a set of standards and verifying that it is correct.

Analyzing Data or Information: Identifying underlying principles, reasons, or facts by breaking down information or data into separate parts.

Reasoning/Decision Making

Making Decisions and Solving Problems: Combining, evaluating, and reasoning with information and data to make decisions and solve problems. These processes involve making decisions about the relative importance of information and choosing the best solution.

Thinking Creatively: Originating, inventing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Updating and Using Job-Relevant Knowledge: Keeping up-to-date technically and knowing one's own job's and related jobs' functions.

Developing Objectives and Strategies: Establishing long-range objectives and specifying the strategies and actions to achieve these objectives.

Scheduling Work and Activities: Scheduling events, programs, and activities, as well as the work of others.

Organizing, Planning, and Prioritizing Work: Developing plans to accomplish work, and prioritizing and organizing one's own work.

Work Output

Performing Physical and Manual Work Activities

Performing Complex/Technical Activities

Interacting with Computers: Controlling computer functions by using programs, setting up functions, writing software, or otherwise communicating with computer systems.

Drafting, Laying-out, and Specifying Technical Devices, Parts, or Equipment: Providing documentation, detailed instructions, drawings, or specifications to inform others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.

Implementing Ideas, Programs, Systems, or Products: Conducting or carrying out work procedures and activities in accord with one's own ideas or information provided through directions/instructions for purposes of installing, modifying, preparing, delivering, constructing, integrating, finishing, or completing programs, systems, structures, or products.

Repairing and Maintaining Mechanical Equipment: Fixing, servicing, aligning, setting up, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.

Repairing and Maintaining Electronic Equipment: Fixing, servicing, aligning, setting up, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of electronic (not mechanical) principles.

Documenting/Recording Information: Entering, transcribing, recording, storing, or maintaining information in either written form or by electronic/magnetic recording.

Interacting with Others

Communicating/Interacting

Interpreting the Meaning of Information for Others: Translating or explaining what information means and how it can be understood or used to support responses or feedback to others.

Communicating with Supervisors, Peers, and Subordinates: Providing information to supervisors, fellow workers, and subordinates. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer.

Communicating with Persons Outside the Organization: Communicating with persons outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged face-to-face, in writing, or via telephone/electronic transfer.

Establishing and Maintaining Interpersonal Relationships: Developing constructive and cooperative working relationships with others.

Assisting and Caring for Others: Providing assistance or personal care to others.

Selling or Influencing Others: Convincing others to buy merchandise/goods, or otherwise changing their minds or actions.

Resolving Conflicts and Negotiating with Others: Handling complaints, arbitrating disputes, and resolving grievances, or otherwise negotiating with others.

Performing for or Working Directly with the Public: Performing for people or dealing directly with the public, including serving persons in restaurants and stores, and receiving clients or guests.

Coordinating/Developing/Managing/Advising Others

Coordinating the Work Activities of Others: Coordinating members of a work group to accomplish tasks.

Developing and Building Teams: Encouraging and building mutual trust, respect, and cooperation among team members.

Teaching Others: Identifying educational needs, developing formal training programs or classes, and teaching or instructing others.

Guiding, Directing, and Motivating Subordinates: Providing guidance and direction to subordinates, including setting performance standards and monitoring subordinates.

Coaching and Developing Others: Identifying developmental needs of others and coaching or otherwise helping others to improve their knowledge or skills.

Providing Consultation and Advice to Others: Providing consultation and expert advice to management or other groups on technical, systems-related, or process-related topics.

Administering

Performing Administrative Activities

Staffing Organizational Units: Recruiting, interviewing, selecting, hiring, and promoting persons for an organization.

Monitoring and Controlling Resources: Monitoring and controlling resources and overseeing the spending of money.

ORGANIZATIONAL CONTEXT

Occupation Specific Requirements

Occupational skills
Occupational knowledges
Tasks
Duties
Machines
Tools
Equipment

ORGANIZATIONAL CONTEXT

Occupational Characteristics

Information on industry, job opportunities, and pay provided by linkages to other databases from:

The Bureau of Labor Statistics (BLS)
The National Occupational Information Coordinating Committee (NOICC)
The Department of Education
The Office of Personnel Management (OPM)

The AccuVision Workplace Success Skills System

From Learning Resources, Inc., the AccuVision Workplace Success Skills System contains five video-based assessment modules that measure SCANS-based employability skills that employers have identified as critical for success in pre-supervisory, entry-level positions in service and manufacturing organizations. The competencies measured by the Workplace Success Skills include:

Interacting with Others	• Helps resolve differences of opinion or interpersonal conflicts (e.g., takes action to stop bickering, encourages cooperation). • Interacts with others in a polite and effective manner (e.g., encourages cooperation, responds to others in a non-defensive manner, avoids personal criticisms). • Assists those with less experience (e.g., helps people learn new tasks). • Encourages others to maintain good work habits (e.g., comply with safe work practices, come to work on time, work productively). • Deals effectively with angry or demanding people (e.g., avoids becoming angry, acts as a concerned peacekeeper, keeps disagreements on a constructive level). • Demonstrates a concern about problems and issues voiced by others (e.g., avoids an 'it's not my job' position, encourages others to provide feedback on their performance and/or ways they could improve).

	• Initiates action on problems; doesn't wait for someone else to do something. • Provides colleagues with constructive guidance (e.g., offers others suggestions about how to improve quality or productivity). • Acknowledges the positive work efforts and accomplishments of others (e.g., thanks others for help or assistance given, notices and mentions jobs done well by others). • Encourages others to do high quality work (e.g., sets high personal standards, discusses the importance of quality with others, encourages taking the time to do the job right the first time). • Asks others for their views and opinions (e.g., attempts to involve others in problem-solving activities, bounces ideas off of people and asks for feedback). • Identifies problems and means of dealing with them (e.g., offers good suggestions for ways to improve quality, productivity and about how to handle unexpected problems).
Listening	• Clearly understands and recalls oral instructions (e.g., understands instructions, implied meanings, remembers prior conversations accurately).
Structuring Work Activities	• Determines priorities (e.g., recognizes conflicting priorities, determines best way to schedule activities). • Recognizes issues which s/he should handle versus those to be dealt with by supervisors. • Structures own work (e.g., can determine best way to structure and plan a task for completion).
Trainability	• Learns new skills and knowledge (e.g., learns new work procedures quickly, takes on additional responsibilities with minimal training).
Graphs and Charts	• Interprets and applies information found in a chart or table format.

AON Consulting Survey of Human Resource Trends

AON Consulting and the Society for Human Resource Management conducted a national survey in 1997, receiving more than 1,700 responses from HR professionals across the United States. The survey asked a number of questions concerning issues faced in Human Resources. As part of the survey, questions were asked about the skill level of job applicants and those of current employees. The report of the findings does not list all skills reported, but categorized them as "weak" to indicate a concern for deficiency in these areas. The results are listed below:

	Percent Rated as "Weak"			
Competencies	**Non-Management Applicants**	**Management Applicants**	**Non-Management Employees**	**Management Employees**
Dealing with change	44%	44%		43%
Problem solving/reasoning	43%		30%	
Creativity/ innovation	42%	24%	38%	
Communications	41%	25%	30%	32%
Basic skills (reading, writing, math)	38%			
Interpersonal/ team skills	37%	25%		26%
Work orientation	37%			
Technical/ business skills	36%			
Loyalty/ commitment			26%	
Leadership		35%		36%
Work attitudes			29%	

Arizona Workplace Skills Standards (Draft)

A draft was prepared in 1996 of Workplace Skills Standards for students in Arizona. These critical workplace skills were seen as essential for individuals regardless of personal, career, or educational plans. Eight standards were set, each with five levels of performance: readiness, foundation, essential, proficiency, and distinction. For the purpose of this report, the essential level is used, unless otherwise indicated:

Students use principles of effective oral, written and listening communication skills to make decisions and solve workplace problems.	• Deliver a speech clearly, with expression and in an organized fashion, make eye contact with the audience, and convey the message through non-verbal as well as verbal communications. • Describe communication practices used with sensory-impaired individuals. • Demonstrate correct grammar and punctuation in writing.

	• Respond to oral and written presentations by formulating relevant feedback, express opinions, discern the main idea, and distinguish fact from opinion. • Interpret, clarify, and evaluate a presenter's point of view. • Speak in a content area (e.g., science, social studies, literature), use vocabulary of the subject accurately, locate and interpret information in documents such as manuals, graphs, and schedules. • Identify the relevant details and facts of written material. • Write formal communications that have a definite audience and clear purpose, contain no gaps, omissions or assumptions which impede comprehension, and follow the proper form whether it be a personal or business letter, message, memo, manual directions or applications.
Students apply computation skills and data analysis techniques to make decisions and solve workplace problems. (Proficiency Level)	• Select and use appropriate computation techniques (i.e., mental, paper, pencil and technology) to solve problems and determine reasonableness of results. • Construct projections and trends from raw data, charts, tables and graphs that summarize data from workplace situations.
Students apply critical and creative thinking skills to make decisions and solve workplace problems.	• Utilize information acquired from several sources and transfer information learned in one situation to another. • Devise and implement a plan of action by specifying goals and constraints. • Generate alternatives, consider risks, evaluate and choose solutions. • Monitor progress and lame adjustments to meet stated objectives. • Reflect on the action taken to determine what has been gained, lost or achieved. • Identify need for data, obtain it, and develop a validation instrument for determining its accuracy.
Students work individually and collaboratively within team settings to accomplish objectives.	• Identify ways to build mutual trust and respect and develop an action plan for negotiating concerns. • Analyze the difference between individuals and group decisions and accomplishments. • Exert a high level of effort and perseverance toward goal attainment as a member of a team. • Assume leadership roles in team settings.
Students demonstrate a set of marketable skills that enhance career options.	• Evaluate areas of interest and/or potential career choices. • Demonstrate work ethics and behaviors for success as defined by school and community.

	• Demonstrate the connection between academic skills and career pathways by identifying required education and training to achieve career choice(s). • Identify careers that capitalize on individual strengths and interests. • Apply the basic academic skills to develop a resume, job application and interviewing techniques.
Students illustrate how social, organizational, and technological systems function. [Definition: A system equals an organized framework made up of interrelated components acting together as a whole, in which a change in one component may affect the entire operation. For example: social systems, i.e., family, school, technological systems, i.e., local area network, telephone.]	• Identify the factors impacting the level of effectiveness of systems.
Students demonstrate technological literacy for productivity in the workplace.	• Demonstrate basic computer operation skills in a variety of applications to organize information. • Use technology to organize information resources such as library and interlibrary catalog databases.
Students apply principles of resource management and develop skills that promote personal and professional well-being.	• Set and prioritize a set of balanced goals related to school, home, education and career planning, and allocate sufficient time, materials, and resources to each task. • Describe the importance of balancing home, school, and community activities to reduce stress.

Assessing Literacy in the Workplace

In an article by Geroy and Erwin (1988), knowledge and skill needs were assessed for a variety of jobs and then classified into five major knowledge and skill areas that were deemed essential:

Procedural Knowledge:	Required to complete tasks successfully in the context of proceduralized job activities.
Technical Knowledge:	Required to complete a particular task specific to an organizational process or system.
General Knowledge:	Required to complete tasks common to other tasks or jobs within the organization.
Systems Knowledge:	Required to diagnose, troubleshoot, and adjust systems (e.g., hydraulic, bill-paying).
Basic Skills:	Abilities such as reading, writing, and computation.

ASTD Update: Basic Skills

Gainer (1988) grouped employability skills into four major areas:

Individual competence skills:	communication skills, comprehension, computation, and culture.
Personal reliability skills:	personal management, ethics, and vocational maturity.
Economic adaptability skills:	problem-solving, learning, employability, and career development.
Group and organizational effectiveness skills:	interpersonal, organizational, skills in negotiation, creativity, and leadership.

Australia's Key Competencies

As a continuation of the Finn Report, a committee sought to describe the "Key Competencies" in order to provide a common reference point for curriculum and teaching in both the school and training sectors and to provide the basis for a consistent approach to assessing and reporting achievement. The committee concluded in 1992 that there are seven Key Competencies that all young people need to enable them to participate effectively in the emerging forms of work and work organizations.

Collecting, Analyzing and Organizing Information	The capacity to locate, sift, and sort information in order to select what is required and present it in a useful way, and evaluate both the information itself and the sources and methods used to obtain it.
Communicating Ideas and Information	The capacity to communicate effectively with others using the range of spoken, written, graphic and other non-verbal means of expression.
Planning and Organizing Activities	The capacity to plan and organize one's own work activities, including making good use of time and resources, sorting out priorities and monitoring one's own performance.
Working with Others and in Teams	The capacity to interact effectively with other people both on a one-to-one basis and in groups, including understanding and responding to the needs of a client and working effectively as a member of a team to achieve a shared goal.
Using Mathematical Ideas and Techniques	The capacity to use mathematical ideas, such as number and space, and techniques, such as estimation and approximation, for practical purposes.
Solving Problems	The capacity to apply problem-solving strategies in purposeful ways, both in situations where the problem and the desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome.
Using Technology	The capacity to apply technology, combining the physical and sensory skills needed to operate equipment with the understanding of scientific and technological principles needed to explore and adapt systems.

Basic Skill Requirements for Selected Army Occupational Training Courses

This study (Moore, Shaffer & Seifert, 1985) investigated the basic knowledge and cognitive skills a soldier must possess for successful completion of the Army entry-level training. The study identified 55 basic skills, developed by training instructors, and 11 interpretable factors, resulting from factor analysis. The factors were named; the skills that loaded within the factors are also listed. Some skills loaded under more than one factor.

Math

- Reading and understanding schematics, diagrams
- Relating schematic or diagram to real situation
- Breaking down a number into 1s, 10s, 100s, and 1000s
- Adding and subtracting whole numbers
- Multiplying and dividing whole numbers
- Understanding what a fraction is
- Understanding what a decimal is
- Selecting appropriate arithmetic operation for the task
- Using simple formulas
- Selecting appropriate formula for the task
- Reading common scales like ruler or thermometer

Listening

- Following sequential order presented in writing
- Remembering a sequence of steps as presented in writing
- Understanding basic safety signs
- Following procedures as shown by demonstration
- Remembering sequence of steps as shown by demonstration
- Understanding basic civilian vocabulary in information presented orally
- Understanding main idea as presented orally
- Understanding supporting details presented orally
- Remembering information presented orally
- Following oral instructions
- Remembering a sequence of steps as presented orally
- Generalizing from information presented orally
- Knowing how to memorize

Writing

- Writing legibly
- Being able to spell
- Being able to write grammatically
- Knowing how to punctuate
- Proofreading
- Writing understandable statements or sentences

Locating Information	• Being able to alphabetize • Using alphabetical or numerical system to locate information • Using a table of contents • Using one reference to locate another reference • Using a legend or key
Study Skills	• Taking course notes • Relating course notes to material covered in class • Concentrating while studying or working • Giving appropriate attention to details • Persevering (completing assigned task)
Speaking	• Using basic vocabulary understandably • Using speech patterns that are easily understood • Expressing thoughts clearly • Following procedures as shown by demonstration • Remembering sequence of steps as shown by demonstration
Understanding Graphics	• Reading and understanding tables, graphs, charts • Reading and understanding schematics, diagrams • Relating text to corresponding graphics • Relating schematic or diagram to real situation • Using one reference to locate another reference
Reading	• Understanding and using basic civilian vocabulary • Recognizing familiar civilian words in written context • Reading for and understanding main ideas • Reading for and understanding details
Asking Questions	• Reading for and understanding details • Asking appropriate questions • Asking a series of questions to gain detailed information • Relating picture to real situation
Counting	• Counting from 1 to 100 • Breaking down a number into 1s, 10s, 100s, and 1000s • Adding and subtracting whole numbers
Reading for Detail	• Reading for and understanding details • Following written instructions • Following sequential order presented in writing • Remembering a sequence of steps as presented in writing

Basic Skills in the U.S. Workforce

The Center for Public Resources (CPR) organized a task force in 1983 to define the problem of basic skills deficiencies from the business, union and school perspectives. CPR conducted a national survey, receiving returns from 184 businesses and 123 school systems throughout the country. The survey contained skill categories and competencies developed by CPR on the basis of early definitions produced by the College Board in 1981.

Reading	• The ability to identify and comprehend the main and subordinate ideas in a written work and to summarize the ideas in one's own words. • The ability to recognize different purposes and methods of writing, to identify a writer's point of view and tone, and to interpret a writer's meaning inferentially as well as literally. • The ability to vary one's reading speed and method according to the type of material and one's purpose for reading. • The ability to use the features of printed materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, bibliography. • The ability to define unfamiliar words by decoding, using contextual clues, or by using a dictionary.
Writing	• The ability to organize, select, and relate ideas and to outline and develop them in coherent paragraphs. • The ability to write Standard English sentences with correct sentence structure, verb form, punctuation, capitalization, possessives, plural forms, and other matters of mechanics, word choice, and spelling. • The ability to improve one's own writing by restructuring, correcting errors, and rewriting. • The ability to gather information from primary and secondary sources; to write a report using this research; to quote, paraphrase, and summarize accurately; and to cite sources properly.
Speaking and Listening	• The ability to engage critically and constructively in the exchange of ideas. • The ability to answer and ask questions coherently and concisely, and to follow spoken instructions. • The ability to identify and comprehend the main and subordinate ideas in discussions, and to report accurately what others have said. • The ability to conceive and develop ideas about a topic for the purpose of speaking to a group; to choose and organize related ideas; and to present them clearly in Standard English.

Mathematics	• The ability to perform the computations of addition, subtraction, multiplication, and division using natural numbers, fractions, decimals, and integers. • The ability to make and use measurements in both traditional and metric units. • The ability to use effectively the mathematics of integers, fractions, and decimals, ratios, proportions, and percentages, roots and powers, algebra, and geometry. • The ability to make estimates and approximations, and to judge the reasonableness of a result. • The ability to use elementary concepts of probability and statistics.
Science	• The ability to understand the basic principles of mechanics, physics, and chemistry. • The ability to distinguish problems whose genesis is in basic mechanics, physics, or chemistry. • The ability to apply basic scientific/technical solutions to the appropriate problems.
Reasoning	• The ability to identify and formulate problems, as well as the ability to propose and evaluate ways to solve them. • The ability to recognize and use inductive and deductive reasoning, and to recognize fallacies in reasoning. • The ability to draw reasonable conclusions from information found in various sources, whether written, spoken, tabular, or graphic, and to defend one's conclusions rationally. • The ability to comprehend, develop, and use concepts and generalizations. • The ability to distinguish between fact and opinion.
Other Skills	• Punctuality • Appropriate attire • The ability to work with group settings (interpersonal relations). • The ability to cope with and be consistently productive in a work environment.

The Bottom Line: Basic Skills in the Workplace

This 1988 publication reported the results of a survey of 101 executives conducted by the U.S. Department of Education. Executives from small and medium-sized firms were asked what skills were needed in workplace. The skills identified were:

1) Reading
2) Writing
3) Computation
4) Communication
5) Problem Solving
6) Self Discipline
7) Reliability
8) Perseverance
9) Accepting Responsibility
10) Respecting the Rights of Others

California Career-Technical Assessment Project (CTAP)

Seven workplace skill areas similar to those of ASTD form the basis for the Career Performance Standards of CTAP. The skill areas are not hierarchical, as in the ASTD model. The career standards, which are incorporated in specific career/program curricula, are developmental and should ideally be introduced to students as early as elementary school, according to researchers at Far West Laboratory in San Francisco, California, who are working with the State of California on the CTAP project. The seven career standards are:

Personal Skills	Exhibits a positive attitude; is self-confident, honest, persevering, and self-disciplined; maintains personal hygiene; manages time; balances priorities; and demonstrates a capacity for life-long learning.
Interpersonal Skills	Understands key concepts in group dynamics, conflict resolution, and negotiation; works cooperatively with others, shares responsibilities, accepts supervision, assumes leadership roles, and demonstrates cooperative working relationships with others across gender and cultural groups.
Thinking and Problem-Solving Skills	Exhibits critical and creative thinking skills, logical reasoning, and problem-solving; recognizes problem situations; applies correct mathematical principles to estimate, measure, and calculate problems; identifies, locates, and organizes information for ease of interpretation; and proposes, evaluates, and selects alternative solutions when required.

Communication Skills	Understands the principles of effective communication, communicates orally and in writing, listens to others, follows instructions, and requests additional information or clarification as needed.
Occupational Safety	Avoids physical hazards at work, operates equipment safely, and handles hazardous materials in proper and safe manner.
Employment Literacy	Understands career path options and strategies for obtaining employment opportunities within a chosen field, understands how personal career functions in the work environment, and strives to promote the career through personal growth and professional organizations.
Technological Literacy	Understands and adapts to changing technology, employs technology appropriate to a field, and identifies, learns, and applies new technological skills to improve job performance.

The Chamber of Commerce and National Association of Manufacturers' Survey

This survey of employers, conducted in the early 1980s, focused on views about vocational and general academic education. The Chamber survey results indicated that students receiving specific occupational training were either "much more" or "somewhat more" employable than those receiving a general education. In the National Association of Manufacturers' survey, 85 percent of employers said they would hire a graduate with vocational training over one who had not had vocational training. In general, employers wanted schools to teach general academic and specific employability skills such as attendance, punctuality, and work attitudes.

Chatham-Savannah Compact

The Chatham-Savannah Compact in Georgia investigated workplace skill requirements as part of its effort to increase the employability of its public school graduates. The compact defines employability in terms of the minimal skills needed for entry-level employment. However, the goal is to urge development of skills beyond the minimal level. In February and April 1992, 10 focus groups were conducted with representatives from approximately 25 employers in the sectors of manufacturing, utilities, wholesale/retail trade, financial/insurance/real estate services, and public administration. The purpose of the focus group interviews was to identify actual work tasks performed in a wide range of jobs. The information was used to provide local labor market validation for developmental work conducted by the Center for Remediation and Design in Washington, D.C. The "priority skill areas" for entry-level employment are structured in the SCANS framework as follows:

Resources

Time	Demonstrates the ability to prioritize tasks and to schedule/order events, allocates time, and calculates with units of time (e.g., figuring, shipping, scheduling, time zones).
Money	Interprets and uses financial forms (e.g., money orders, paychecks); and interprets and processes bills, business invoices, and utility bills.
Material and Facilities	
Human Resources	Explains ideas from a work plan and options for implementation, demonstrates the ability to evaluate results, and identifies work-related problems and potential solutions.

Information

Acquires and Evaluates Information	Acquires and evaluates information from written work instructions, work orders, labels, safety warnings, product instructions and procedures manuals, directions in textbooks, manuals and handouts, road/street signs/symbols, maps, tests, logs and journals, telephone books, dictionaries, schedules, job announcements, advertisements, computer printouts, classified advertisements, insurance forms, warranties, contracts and agreements, tax forms, legal notices, and written specifications (e.g., plans, blueprints).
Organizes and Maintains Information	Demonstrates ability to differentiate, sort, and caterorize information.
Interprets and Communicates Information	Completes a job application, receives spoken instructions in the workplace, prints/writes legibly in ink, uses appropriate mechanics of Standard English, uses job-specific vocabulary appropriately, writes short notes and/or simple memos, writes information in clear, logical, and complete manner, takes telephone messages accurately, communicates via telephone, completes application form, reports emergencies, interviews for specific job opening, writes letters using correct structure and sentence style, completes education/training applications, reads and interprets basic measurement and numerical readings, writes common abbreviations specific to job, completes order forms, places orders, explains products and services, organizes information into a brief written report/executive summary, interprets data from tables, charts, and graphs, and asks appropriate questions.

Uses Computers to Process Information	Uses a computer for word processing, completes forms on a computer, uses a computer for composition, and locates information on a computer.
Interpersonal Skills	
Participates as a Member of a Team	Recognizes how feelings affect others and vice-versa, identifies principles of perception and understands how perceptions affect interpersonal relationships on the job, gives and receives feedback, functions effectively as a group member and group leader, accepts responsibility on the job, and displays ability to self-manage.
Teaches Others New Skills	
Serves Clients and Customers	Uses attentive posture and maintains eye contact in listening, chooses words/manner of expression appropriate to the workplace, handles complaints, and explains products and services.
Exercises Leadership	Resolves conflict among co-workers, and generates ideas.
Negotiates	Interacts with co-workers to accomplish a task.
Works with Diversity	
Systems	Visualizes a whole process, anticipates/predicts cause and effect relationships, organizes the tasks to complete a process, and charts performance for process control.
Technology	Specifies and conducts troubleshooting steps in appropriate sequence, and uses different common technologies (e.g., computer, voice mail, electronic mail).
Learning to Learn	
Math/Computation	Performs addition, subtraction, multiplication, and division of whole numbers, common and mixed fractions, decimals, and percentages; performs mathematical operations using such equipment as a calculator, cash register, business machine, and computer-operated equipment; determines estimates, rounds off numbers, computes averages, and performs basic measurement tasks to determine length, width, and height; determines ratios, interprets ratios and proportion; and converts U.S. Standard to International Metric System of measurement and vice-versa.

Colorado Department of Education

In 1983, the Colorado Department of Education surveyed and interviewed Colorado area employers and young entry-level employees to determine the skills needed for entry-level jobs available for high school graduates. The basic skills list was formulated from interviews with employers. The list was updated in 1990 by adding skills cited in the current literature and asking business people to review the additions. Although some reviewers expressed concern that their businesses would not require such skills of entry-level workers, skills were added in the areas of scientific/technological, creative/innovative, team participation, and leadership. The following list represents 18 skill areas identified as most important for high school graduates to possess, regardless of the position level (e.g., entry):

Job Seeking/Career Development Skills	Knows resources for career information; knows own abilities, aptitudes, and interests; knows occupational characteristics; identifies career/occupational goals; develops a career plan; engages in courses/activities to implement plans; identifies and researches potential employers; knows employment position desired; develops an application portfolio; accurately completes an inquiry letter, resume, follow-up letter, and job application; handles interview competently; and seeks information about future education or training.
Math Skills	Understands importance of math in jobs; performs arithmetic calculations; uses values from graphs, maps, and tables; uses English/metric measurements; compares numerical values; applies geometric principles; uses formulas correctly; constructs diagrams, tables, and records; uses elementary statistics; uses instruments to solve problems; and uses mathematics in solving problems.
Computer Skills	Becomes aware of computer functions; inputs and accesses data from computer; has experience with computer programs; and understands issues associated with computer use.
Reading Skills	Understands the importance of reading in jobs; develops vocabulary related to work tasks; reads for details and special information; interprets pictures, graphs, and symbols; locates information in reference materials; follows intent of written directions/instructions; interprets ideas and concepts (comprehension); and reads accurately at appropriate rate.
Writing Skills	Understands the importance of writing in jobs; applies basic writing principles; uses reference materials; develops handwriting legibility; composes formal letters; fills out forms; records messages; writes memorandums; composes an ad; writes instructions and directions; writes reports; develops summaries; takes notes and/or outlines; and corrects written materials.

Communication Skills	Listens to others; reports information accurately/concisely; follows intent of oral directions/instructions; speaks distinctly; formulates and asks questions; answers questions accurately; explains activities and ideas clearly; uses appropriate vocabulary/grammar; gives clear instructions and directions; stays on topic; uses non-verbal signs appropriately; develops oral presentations; presents information effectively to groups; and obtains an appreciation for foreign languages.
Scientific/Technological Skills	Demonstrates scientific ways of thinking; demonstrates scientific literacy; and demonstrates technical skills.
Business Economic Skills	Understands business organizations; understands factors affecting profitability; understands business competition; knows about processes of marketing; knows about processes of production; and understands business costs.
Personal Economic Skills	Knows how to evaluate products and services, access community resources/services, compute working hours/wages, handle financial affairs, handle records of income and expenses, make price-quality comparisons, prepare state and federal tax forms, evaluate insurance programs, and determine credit costs; understands legal rights in agreements; and uses various forms of transportation.
Manual Perceptual Skills	Constructs and assembles materials, uses specific hand tools and instruments, develops visual presentations, masters keyboard skills, and operates power equipment.
Cross-Cultural Skills	Understands the impact of cross-cultural/international relationships, demonstrates sensitivity to cultural differences, interacts with people of different cultures, and takes opportunities to experience new places and people.
Interpersonal Skills	Functions cooperatively with others, exhibits openness and flexibility, seeks clarification of instructions, exercises patience and tolerance, acts on suggestions about improving skills, shows initiative in getting work done, expresses opinions with tact, demonstrates ability to negotiate differences with others, and demonstrates a good sense of humor.
Self-Discipline Skills	Remains free from substance abuse, maintains punctuality, meets attendance requirements, accepts assignments, takes responsibility for own actions, maintains consistent effort, works independently, manages time effectively, respects the rights and property of others, presents a neat appearance, demonstrates self control, and maintains an appropriate level of health.

Work Activity Skills	Applies standards of quality to work assignments, adheres to policies and regulations, keeps work area in good/safe condition, exhibits interest in future career, suggests or makes workplace improvements, knows sources of continuing education, knows about basic employee rights/student rights, knows about basic employee/student responsibilities, knows basic steps in getting a raise or promotion, knows how to terminate employment/school positions, demonstrates enthusiasm for work/studies, and takes pride in accomplishments.
Problem Solving/Reasoning Skills	Identifies problems that need a solution, plans procedures, collects information/resources, organizes information/resources, interprets information, formulates alternative approaches, selects efficient approaches, implements procedures/strategies, reviews progress, evaluates activities, corrects errors, makes conclusions, summarizes and communicates results, and uses results to develop new ideas.
Creative/Innovative Skills	Creates and develops plans for improvement, demonstrates imaginative thinking (new ways of doing things), and demonstrates ability to improvise.
Team Participation Skills	Helps identify mission/goals of team, participates in team decision-making, follows rules and procedures set by team, communicates with team members, shows sensitivity to ideas of team members, cooperates with team members, and supports actions taken by team.
Leadership Skills	Organizes group or team activities, provides process directions for others, facilitates others in obtaining further knowledge/experiences, motivates and inspires enthusiasm, takes risks and accepts responsibility, trusts others and shares responsibility, and shares the rewards of accomplishment.

Consensus Framework for Workplace Readiness

The CCSSO is sponsoring the Workplace Readiness Assessment Consortium, which has developed a consensus framework that reflects the commonality among various definitions of work readiness or employability skills. The consortium was formed to allow interested parties to work together to develop and share assessment models for workplace skills. Sources of the consensus framework include business expectations, national studies such as SCANS and ASTD, state studies such as those conducted in Michigan and New York, educational research and development organizations, school districts, and universities. The 1995 revision of the framework consists of the following nine major categories of skills accompanied by representative examples:

Personal Management

Develops and maintains personal characteristics and behaviors necessary for success in the workplace, such as:

- Acts responsibly, dependably, and conscientiously
- Behaves with integrity
- Refrains from substance abuse
- Works safely
- Demonstrates initiative, motivation, and perseverance
- Demonstrates promptness
- Adapts to change
- Manages personal resources
- Improves personal fitness/health
- Avoids absenteeism

Academic Foundations

Develops and improves applied academic skills necessary for the workplace in the following areas:

- Mathematics
- Communication skills
- Science and technology
- Social science
- Health and physical education
- The arts

Career Development

Plans and prepares for current and future career options, based on personal qualities and interests:

- Evaluates own interests, strengths, and weaknesses
- Identifies appropriate occupational choices
- Selects personal career path(s)
- Takes steps to achieve career goals
- Demonstrates self-motivated learning

Interpersonal

Develops and maintains effective and productive groups by demonstrating the ability to:

- Provide leadership and followership as appropriate
- Build consensus
- Deal with conflict effectively
- Negotiate agreements
- Work with all members of the workforce
- Listen attentively
- Actively participate in work-related discussions
- Respect the dignity of others
- Understand differences of opinion
- Meet the needs of others, such as clients or customers
- Respect the dignity of work

Thinking/Problem Solving

Demonstrates the ability to generate innovative and practical solutions to real-world problems:

- Defines the problem
- Analyzes the problem and/or situation
- Evaluates available information
- Develops and analyzes potential solutions or options
- Incorporates creativity, intuition, hunches
- Allocates necessary resources
- Makes defensible decisions
- Monitors progress toward goals
- Repeats these steps as necessary

Technology

Selects, applies, and maintains tools and technologies:

- Learns about current and emerging technologies
- Applies thinking/problem-solving skills to technology situations
- Applies technology solutions to problem situations
- Evaluates and improves technology

Communication

Receives, processes, and conveys information using a variety of sources (such as written, verbal, non-verbal, and symbolic; technological, multi-media; abstract as well as concrete) to:

- Gather information efficiently
- Organize and maintain information
- Interpret information
- Share information
- Receive and use both positive and negative feedback

Workplace Systems

Determines how an individual job fits into the overall organization, how the organization fits into the industry, and how the industry fits into the overall economy, in order to:

- Identify the subparts of the system
- Know how the parts fit together
- Understand how the work flows through the system

Participation in the Work Organization

Contributes to the accomplishment of the organization's purpose by working to:

- Assist the organization to set goals as well as the procedures to implement the goals
- Help achieve organization goals
- Assist in continuous improvement
- Initiate suggestions for improving the organization
- Demonstrate loyalty to the organization and its goals
- Communicate responsibly with co-workers
- Teach and learn from others on the job
- Carry out assigned duties

The Employability Inventory

In his investigation of employability skills, Hartz (1978) discovered several qualities and skills that employers thought successful employees should have. These skills cover the finding and acquiring of jobs and those used to maintain employment. The Employability Inventory measures the level of knowledge and skills of eight categories that Hartz developed as a profile of the ideal employee.

Responsible:	performing the job with proper standards and using care in handling tools and equipment.
Emotionally stable:	responding to stress in an appropriate fashion in the work environment.
An initiator:	performing assigned tasks at or above the required level.
Conscientious:	meeting expectations of performance by spending additional time when necessary to accomplish a task at a high standard.
Skilled in interpersonal situations:	maintaining good relations with co-workers.
Skilled in interpersonal situations:	maintaining good relations with supervisors (e.g., loyal, honest, respectful).
Dependable:	arriving at work punctually and consistently and attending all expected functions.
Pleasant in appearance and hygiene:	complying with an appropriate dress code and maintaining acceptable levels of personal cleanliness and grooming.

The Employer's Choice In the Job Search

According to Lankard (1987), a fifth basic skill called "employability" addresses skills in addition to communication, mathematics, science, and job-specific and vocational skills. The author noted seven categories of employability skills required for getting and keeping a job:

Presents a positive image:	includes good grooming practices, good health habits, appropriate dress, and self-confidence.
Exhibits positive work attitudes:	includes using basic social skills, creativity, willingness to learn, and pride in work.
Practices good work habits:	includes maintaining regular attendance, being thorough, and diligently following safety practices.
Practices ethical behavior:	includes exercising integrity and good judgment, respecting property, and following company rules.
Communicates effectively:	includes demonstrating speech, writing, and non-verbal communication skills (e.g., listening).

Accepts responsibility:	includes problem-solving, taking the initiative, and assuming personal responsibility.
Cooperates with others:	includes working as a team member and working well under supervision.

Equipped for the Future

The National Institute for Literacy is developing content standards and performance indicators that translate skills and knowledge into a clear set of results for adult literacy and basic skills training programs. Through a consensus building process, Equipped for the Future has defined critical functions adults must carry out in order to carry out the roles of worker, parent, and citizen. The framework includes 12 Common Activities, 17 Generative Skills, and 6 Knowledge Domains. A draft of the content standards was to be completed in early 1998.

Common Activities

Gather, Analyze, and Use Information	Find and analyze information from diverse sources. Use it to form opinions, make decisions, and take action.
Manage Resources	Find, manage, share and allocate time, money and material resources. Use resources in a way that supports your own needs, goals, and priorities and those of the family, organization, or community.
Work within the Big Picture	Recognize and monitor the social, economic, political and organizational systems of which you are a part. Work with their structures, rules and expectations, practices and cultures in setting a course of action.
Work Together	Work with family members, neighbors or co-workers to get things done.
Provide Leadership	Inspire, influence, direct and motivate others. Take responsibility for results.
Guide and Support Others	Help others succeed by setting an example, providing training, or giving other kinds of assistance.
Seek Guidance and Support from Others	Seek out the support you need from others.
Develop and Express Sense of Self	Examine, clarify and express your values, beliefs, culture, and history. Use your understanding of self to guide your actions.
Respect Others and Value Diversity	Respect and appreciate the values, beliefs, cultures, and history of others. Use this appreciation to counteract prejudice and stereotypes.

Exercise Rights and Responsibilities	Act and advocate on behalf of yourself and others based on a knowledge of your rights and responsibilities and those of others.
Create and Pursue a Vision and Goals	Establish a vision and goals. Use your vision and goals to identify, plan, and prioritize tasks and activities.
Keep Pace with Change	Look ahead to challenges and prepare for them by learning new skills, adapting current skills to new challenges, and learning from your own and others' experiences.

Generative Skills

Communication Skills	• Read Critically Use decoding and pre-reading strategies to comprehend and interpret text. Distinguish fact from opinion, understand different text perspectives, and compare personal knowledge and experience to other information sources. • Convey Ideas in Writing Apply basic principles of composition and organization to communicate ideas and information. Use English language conventions of spelling, punctuation, grammar, and sentence and paragraph structure. • Speak So Others Can Understand Convey information, ideas, and opinions by speaking clearly, asking questions, monitoring the effectiveness of the message, and adjusting tone and content to fit a variety of audiences. • Listen Actively Attend to what others say. Identify the perspective and intent of the speaker. Relate what is said to prior knowledge and experience. Evaluate and critique for content, purpose, and use. • View Critically Gather and analyze information presented visually. Evaluate and critique the visual material for content, purpose and use. Consider what is not shown as well as what is shown.
Interpersonal Skills	• Cooperate with Others Work with others across differences in culture, ethnicity, social background, belief, or physical abilities. Use principles of group dynamics and consensus-building strategies, building on the strengths of individual group members, including yourself. • Advocate and Influence Use a variety of communication strategies to build a case for your views or strategies. Present in ways that persuade others to adopt your point of view, make desired changes in existing structures, and take action. Monitor the situation to determine whether your actions make a difference.

- Resolve Conflict and Negotiate
  Identify areas of agreement and disagreement. Develop and evaluate options for achieving an acceptable compromise. Carry out a compromise plan and evaluate its effectiveness.
- Guide
  Assess the needs of others and use a variety of techniques to assist them or develop their skills. Model appropriate attitudes, actions, and communication for others.
- Lead
  Initiate and manage plans for action and change. Organize and inspire others to act on them. Share responsibility and delegate to others. Coach and mentor others and facilitate the work of groups. Evaluate and monitor the achievement of results to inform further actions.

Decision-Making Skills

- Plan
  Set and prioritize goals for yourself or for an organization. Plan and organize activities to achieve them. Identify and secure the resources needed and make sure they are used wisely. Monitor and evaluate the effectiveness of what is done.
- Research
  Seek out information from multiple sources. Summarize and organize for analysis, and evaluate for relevance and use. Communicate findings to others by summarizing, drawing conclusions, and defining issues.
- Solve Problems
  Recognize a need for decisions to be made or problems solved. Generate new ideas and perspectives to develop alternative solutions. Decide on the best course to follow, and monitor the results to guide further actions.
- Use Mathematical Concepts and Techniques to Solve Problems
  Perform basic math computations. Use tools such as charts, graphs, tables, spreadsheets, estimation, statistics, and measurement to analyze data for sound decision-making.
- Use Technology
  Identify and access the technology needed to solve problems and make decisions. Apply existing skills and learn new skills to keep up with changing technology.

Lifelong Learning Skills

- Reflect and Evaluate
  Reflect on your own experiences, attitudes, and visions of the future. Assess your strengths, values, and opportunities for personal growth.
- Learn in New Ways
  Recognize and value the variety of learning styles used by others as well as yourself. Apply existing skills to new situations. Use new ways of thinking, and learn new skills.

Knowledge Domains

- How We Grow and Develop
  Includes knowledge about physical and intellectual growth as well as spiritual and psychological development. Linked to this domain is an understanding of personal qualities such as persistence, initiative, dependability, integrity, and self-confidence.
- How Groups and Teams Work
  Includes knowledge about the purposes of groups and teams, the stages of their development and their dynamics, and the processes that make groups and teams effective.
- How Systems Work
  Includes understanding the nature and structure of formal and informal systems, how power is distributed in systems, the official and unofficial rules operating within the system, and how various systems interact, such as family, schools, healthcare, and social services.
- Rights and Responsibilities
  Focuses on understanding the fundamental concepts that are central to democratic ways of life, including the provisions of the Constitution of the United States and the rights and responsibilities of citizenship; political and legal processes and rights, consumer rights, landlord and tenant rights and responsibilities; and employment agreements and union contracts.
- Culture, Values and Ethics
  Includes knowing the meaning of traditions and culture in our lives, the influence of language on culture, how individuals are shaped by family and community values, and the effects of values and ethics on law and government.
- How the Past Shapes the World We Live In
  Includes understanding the historical context of current issues and opportunities, knowing more about what came before, and lessons learned. The historical contexts include family, community, workplace, nation, and world.

Fort Worth: Project C^3

Local businesses and school officials joined together to define exactly what was needed from the school system in terms of skills preparation. Their goal was to provide educators with the resources and guidance that they needed to produce high school graduates with the skills required in the workplace. The committee identified seven major generic skills required in the workplace and specified five levels of proficiency for each skill. A job analysis took place in 1990 with more than 3,000 employees from 300 Fort Worth businesses, analyzing 791 jobs. According to the data, approximately 75 percent of jobs rated at the Intermediate level. For the purpose of this report, the Intermediate level is listed.

Reading

Ability to search for specific information, interrelated ideas, understand main theme or point, make generalizations (e.g., proofreading to delete errors).

Mathematics	Ability to use algebra and geometry concepts to solve practical problems (e.g., calculate the number of yards of material needed for a pattern, calculate arrival times in transportation).
Writing	Ability to write to inform and express ideas accurately with correct spelling, quoting and phrasing (e.g., to construct letters and reports, write a business letter to relate actions taken at a meeting).
Speaking and Listening	Ability to organize and express ideas, directions, and data in a logical sequence (e.g., describe how something works, explain to someone else how to perform a task).
Computer Literacy	Ability to solve problems using multiple software packages (e.g., word-processing, spreadsheet, database, desktop publishing).
Reasoning and Problem Solving	Ability to identify and express problems, develop solutions from alternative methods and procedures (e.g., increase output on assembly line).
Originality and Creativity	Refines concepts or theories discovered or developed by others.

The Fourth R: Workforce Readiness

This 1987 publication, issued by the National Alliance of Business, reported that employers desire not only reading, writing, and computation skills, but also a fourth "R" called "Workforce Readiness." The fourth R encompasses the following skills:

1) Thinking
2) Reasoning
3) Analysis
4) Creativity
5) Problem Solving
6) Reliability
7) Responsibility
8) Responsiveness to Change

Framework for Developing Skill Standards for Workplace Literacy

Dr. Askov at the Institute for the Study of Adult Literacy at Penn State University prepared a study to identify the basic skills that appeared most frequently in the curricula of the National Workplace Literacy Program. The skills were identify from a search of curricula on file at the Department of Education, resulting in 208 database entries. The comparison of the basic skills listed in the curricula is described in eight domains, many of which are drafts or adaptations of O*NET definitions.

Domain 1:
Reading Comprehension

Decodes, interprets, and comprehends information drawn from written documents, etc.	Recognizes technical vocabulary used at the workplace, including abbreviations Follows written directions Locates information Scans materials for specific facts Reads for details

Domain 2: Writing

Communicates thoughts, ideas, information, and messages in writing; planning, generating, and revising text.	Writes short notes and simple memos Enters or transfers information onto a form Flowcharts prose information Takes telephone messages accurately

Domain 3: Oral Communications

Communicates thoughts, ideas, and information orally, attending to the comprehension of listeners and the demands of the setting.	Listens, especially to follow verbal instructions to perform a job task Asks and answers simple questions Makes requests for supplies, days off, etc. Uses correct grammar and word choice Participates actively in team meetings, listening to the input of others and expressing his/her own contributions

Domain 4: Quantitative

Understands basic mathematical computations and problem solving procedures and how these procedures might be used to address various problems.	Performs addition, subtraction, multiplication, and division including whole numbers and multiple operations, common or mixed fractions, decimals, and percentages Converts decimals, fractions, and percents Interprets ratio and proportion Converts numbers to and from the metric system Interprets data from graphs and tables Measures with a ruler and uses measurements in solving problems such as finding area

Domain 5: Problem Solving

Understands basic problem solving procedures and how these procedures might be used to address various problems.	Differentiates, sorts, and classifies information Formulates, evaluates, and chooses options in solving problems Troubleshoots, quickly identifying and solving problems as they arise Predicts outcomes based on available information Prioritizes job tasks for effectiveness and efficiency

Domain 6: Critical Thinking

Recognizes and can analyze the strengths and weaknesses of arguments and propositions using logic to establish the validity of these propositions.	Participates in brainstorming sessions Judges the credibility of sources of information Distinguishes major problems from minor ones Differentiates between relevant and irrelevant information Compares and contrasts information

Domain 7: Knowing How to Learn

Identifies and uses various alternative strategies for working on learning tasks, looking for examples, taking notes, and identifying alternative strategies for working with this material.	Applies appropriate learning style, techniques, strategies, tools, and resources. Manages time effectively, estimating the time to perform each task Maintains a high level of concentration

Domain 8: Cross-Functional Skills

Works with technology, people, resources, and systems to perform activities that occur across jobs.	Transfers skills learned in one job situation or in training to another job Works in a team with people with diverse personalities and cultures Mediates a conflict within a team or with co-workers before it becomes destructive

Future Work

In the 1990 book Future Work, authors Coates, Jarratt, and Mahaffie listed skills considered critical for the future workplace. The seven major skill areas identified are:

Positive Skills or Attributes	Creativity, basic literacy skills (reading, writing, computation), inventiveness, retrainability, spatial ability, physical coordination, interpersonal perception, reasoning abilities, teaching/learning capacity.
Scientific or Technical Skills	Computer competency; competency in computer-aided design, computer-aided manufacturing, and computer-assisted engineering; engineering skills and design; information-based skills; software, hardware, and systems design; scientific skills; mathematical skills; technical skills in science; skills in applied psychology and behavioral sciences, engineering and medical research, biotechnology, genetic screening, and nursing and related professional caretaking skills.

Specialty Skills	Abilities characteristic of highly skilled workers, craft skills, maintenance and repair of complex systems, international/global orientation, language skills, technology-transfer skills, and systems-integration skills.
Executive and Managerial Skills	Leadership, working with others and on teams, decision making, entrepreneurship, and communication skills.
Regulatory and Enforcement Skills	Scientific fraud investigation, forensic accounting, ethical thinking on decisions, security specialist skills, and whistle-blowing.
Social Management Skills	Paired professional abilities (e.g., nurse-attorney, scientist-manager), expertise in community relations, and long-range planning skills.
Maintenance and Cleanup Skills	Waste-disposal expertise, disaster-minimization skills, skills of cleanup crews, triage specialist skills, building-maintenance skills, and food service skills.

Getting a Job After College - What Skills are Needed?

Murphy & Jenks (1983) reported on a series of interviews with 48 large employers in the San Francisco Bay area representing service, transportation, communication, utilities, government, retail, manufacturing, finance, and insurance employment sectors. The purpose of the study, conducted by Far West Laboratories and Educational Research and Development, was to identify traits of successful entry-level professional employment applicants. Although a small number of interviews were conducted, employers consistently identified skills that Murphy & Jenks classified in three categories:

Adaptive Skills	These are defined as those that describe how employees interact with their work environment. They include work habits, attitudes, and personality characteristics. The most frequently cited adaptive skills were tactfulness, assertiveness, ability to be a quick learner, positive attitude, and good appearance.
Functional Skills	These are defined as task-related and useful in many employment situations. The functional skills most often cited were communication, writing, interpersonal, and verbal. Others noted were problem-solving, analysis, listening, mathematics, organization, and research.
Technical or Content-Specific Skills	These are least important to the employers surveyed. The employers viewed Adaptive and Functional Skills as more important because they felt employees could learn Technical or Content-Specific skills through on-the-job training programs.

High School Curriculum Study

Baxter and Young (1980) conducted a survey in a six-county area of Mississippi to identify skills and attitudes considered important within large and small businesses representing manufacturing, service, public employment, wholesale merchants, and retail merchants. The purpose of the survey was to compare high school curriculum to student employability. A sample of 2,110 school administrators, teachers, high school seniors, former seniors, and personnel directors responded to a mail survey in which they were asked to rank-order the skills and attitudes they thought were the most important for young people entering the workforce. The results of the survey are as follows, with skills and attitudes rank-ordered from most important to least important for an entry-level worker:

1) Being dependable
2) Reading and understanding what has been read
3) Staying with a task until it is finished
4) Following spoken instructions
5) Getting along with other people
6) Speaking and listening
7) Following written instructions
8) Recognizing the importance of good health
9) Using basic arithmetic
10) Thinking and solving problems
11) Writing
12) Driving a car or truck
13) Directing the work of others
14) Keeping records and books
15) Performing secretarial work
16) Using shop tools

High Schools and the Changing Workplace: The Employer's View

In 1984, National Academy of Science (NAS) members identified ten core competency areas required for all workers. A panel of employers, labor union representatives, scholars, and educators examined the skills required of high school graduates entering the workforce after graduation. The NAS identified the following list of competency areas:

Command of English Language	
Reasoning and Problem Solving	Identifies problems, considers and evaluates possible alternative solutions, weighs their risks and benefits, formulates and reaches decisions logically, separates fact from opinion, adjusts to unanticipated situations by applying established rules and facts, works out new ways of handling recurring problems, determines what is needed to accomplish work assignments.

Reading	Understands the purpose of written material, noting details and facts; identifies and summarizes principal and subsidiary ideas; identifies inconsistency in written materials, verifies information and evaluates the worth and objectivity of sources, interprets quantitative information (e.g., tables, charts, and graphs).
Writing	Gathers information suitable for the purpose, organizes information in a logical and coherent manner, uses Standard English syntax, applies the rules of correct spelling, punctuation, and capitalization, uses reference books such as a dictionary, thesaurus, and an encyclopedia, writes legibly.
Computation	Adds, subtracts, multiplies, and divides whole numbers, decimals, fractions; calculates distance, weight, area, volume, and time, converting from one measurement system to another (e.g., English to metric and vice-versa); determines the costs, time, or resources necessary for a task; calculates simple interest, costs, and making change; understands simple productivity and statistics; calculates information obtained from charts, graphs, and tables; uses ratios, proportions, percentages, and algebraic equations with a single unknown; estimates results; and judges their accuracy.
Science and Technology	
Oral Communication	Communicates in English, understands the intent and details of oral communication, understands and gives instructions, correctly identifies and summarizes principal and subsidiary ideas in discussions; obtains, clarifies, and verifies information through questioning, participating effectively in discussions.
Interpersonal Relationships	Interacts in a socially appropriate manner; demonstrates respect for the opinions, customs, and individual differences of others; appreciates the importance and value of humor; offers and accepts criticism constructively; handles conflict maturely; and participates in reaching group decisions.
Social and Economic Studies	Has knowledge of the history of present-day American Society; the political, economic, and social systems of the United States and other countries; the fundamentals of economics, including the roles of money, capital investment, product pricing, cost, profit, productivity, and market forces such as supply and demand, the concept of "trade-offs" and the differences between economic principles, facts, and value judgments; the forms and functions of local, state, and federal governments; the rights and responsibilities of citizens; and the civil rights and justice in a free society.
Personal Work Habits	Possesses a realistic, positive attitude toward self; a positive attitude toward work and pride in accomplishment; a willingness to learn; self-discipline, which includes regular and punctual

attendance and dependability; sets goals and allocates time to achieve them; accepts responsibility; works with or without supervision; demonstrates appropriate dress and grooming; understands the need for organization, supervision, rules, policies, and procedures; is free from substance abuse; and practices appropriate hygiene.

Investing in Our Children

The Committee for Economic Development Survey of Employers' Needs surveyed a random sample of Fortune 500 companies as well as 6,000 small companies in 1984. The large companies ranked striving to work well, learning how to learn, priority setting, and communicating as very important. The smaller companies ranked those skills in a similar manner, but also included working well with others. The report notes that employers are looking for entry-level workers who can assume responsibility, demonstrate self-discipline and enthusiasm, take pride in their work, and function as team members. Employers also want workers who can learn new information and solve problems.

Job Skills for the 21st Century

In his book, Jones (1995) looked at several states and groups that had identified skills needed by all workers, including SCANS. From this work, he formed 17 Foundation Skills. He reports that these skills have advantages over earlier lists because they are fewer in number, are measurable, easily communicated to students, and easily taught. The Foundation Skills include:

Basic Skills	Reading
	Writing
	Mathematics
	Speaking
	Listening
Thinking Skills	Creative Thinking
	Problem Solving
	Decision Making
	Visualization
People Skills	Social
	Negotiation
	Leadership
	Teamwork
	Cultural Diversity
Personal Qualities	Self-Esteem
	Self-Management
	Responsibility

Kansas Business Survey

In 1989, Kansas businesses were surveyed in a study by the University of Kansas to determine skills needed in the workplace over the next five years, particularly for dealing with technological change. The study surveyed a total of 1,733 businesses and the final results, reported in a publication outlining the Kansas Training and Retraining Plan, led to the following list of skills rank-ordered by percentage of businesses responding:

1) Adaptability/flexibility
2) Problem solving
3) Teamwork
4) Goal setting and personal motivation
5) Proper attitudes toward work and work habits
6) Comprehension/understanding
7) Organizational effectiveness and leadership
8) Microcomputer skills
9) Listening and oral communication
10) Business/management
11) Computation
12) Interpersonal relations
13) Technical skills
14) Reading

Kansas Competency Index of Workplace Skills

A Competency Index of Workplace Skills also has been developed in Kansas for incorporation into vocational-technical training. The workplace skills were identified through national studies such as SCANS, a survey of employers in northeast Kansas, and teachers and practitioners participating in the Performance Measures and Standards Systems Workgroup. The index is currently undergoing refinement for infusion into both vocational education curriculum and general academic curriculum for secondary and post-secondary institutions. The following enabling objectives, compiled by Washburn University in Topeka, Kansas, were developed for the original full range of workplace skill areas prior to refinement.

Managing Resources	Time management (establishes goals, identifies time wasters, evaluates use of time, sets priorities, develops a time plan); materials management (requisitions supplies/equipment, identifies purchasing sources, explains concept of supply and demand); money management (makes change for a cash transaction, prepares a budget, develops a pricing policy); human resource management (develops a job description, prepares an organization chart); and facility management (complies with safety and health rules, organizes work space).
Team Member Participation	Gives and follows oral directions, applies active listening skills, establishes team standards, and negotiates a compromise.

Computer Literacy	Performs power-up and power-down procedures, identifies parts of keyboard, and uses software applications.
Decision Making and Problem Solving	Identifies steps in the decision-making process, recognizes or identifies a problem, identifies important information needed to solve a problem, and describes application and likely consequences of alternative solutions.
Interpreting and Communicating Information	Exhibits speaking skills, listening skills, and technical reading and writing skills.
Learning Strategies (Learning to Learn)	Organizes learning activities, seeks feedback, and locates and uses expert sources and peer support.
Work Ethics	Applies employee rules, regulations, and policies in a given occupational area; accepts responsibility for position; wears suitable attire; and demonstrates awareness of desirable worker characteristics such as cooperation, integrity, honesty, and friendliness.
Creative Thinking	Reorganizes information and assumptions about a given problem, and connects ideas for which connections are not apparent.
Self-Management	Demonstrates dependability and punctuality; accepts responsibility; demonstrates respect for the opinions, customs and individual differences of others; and adjusts to unanticipated situations in the workplace.
Basic Mathematical Skills	Demonstrates ability to add, subtract, multiply and divide whole numbers, decimals, and fractions; and solves word problems by selecting and using correct order of operations.
Basic Language Arts Skills	Reads, understands, and finds information in books, manuals, directories, etc.; reads and understands forms; uses a dictionary; and interprets workplace documents such as policy manuals, order forms, etc.
Basic Employability Skills	Writes a resume, and identifies educational opportunities for a specific career.

Kentucky Council on School Performance Standards

In Kentucky, a 12-member Council of School Performance Standards was created in February 1989 to: 1). determine what students should know and be able to do, and 2). determine how to assess what they should know and be able to do.

The Council's staff traveled to different locations in Kentucky and met with six groups consisting of community leaders, employers of graduates, parents, school administrators, teachers, and students. The information obtained from these group meetings was used to develop a 22-minute telephone survey consisting of more than 100 questions about what should be expected of a Kentucky high school graduate. The telephone survey resulted in 657 interviews of Kentucky residents selected at random throughout the state, and 201 leaders from business, industry, the community, and education. The results yielded the following six core learning goals:

Communication and Math Skills

Reading	Reads for pleasure and information, adjusts reading speed and method to type of material and purpose, and recognizes different purposes and styles of writing; understands the most important information in the text of a newspaper, technical report, narrative, magazine, etc., reads critically by separating fact from opinion or propaganda, recognizing stereotypes and bias, recognizing inconsistencies, and judging the validity of evidence; defines unfamiliar words by decoding, using contextual clues, and using a dictionary or thesaurus; and applies specific strategies to assist with problems of comprehension in reading.
Writing	Uses a process of planning, drafting, and revising to develop coherent written documents that communicate ideas to intended audiences; selects, organizes, and relates ideas in coherent paragraphs; uses proper grammar, punctuation, and spelling; gathers information; and writes creatively and persuasively.
Speaking and Listening	Engages in constructive spoken exchange of ideas in class discussions with peers and instructors; follows spoken instructions and asks questions; understands the main ideas of speeches, lectures, or media presentations; listens critically to oral or media presentations and separates fact from opinion, bias, propaganda, etc.; prepares and delivers oral presentations to different audiences; and communicates effectively in one-on-one dialogue.
Math Skills	Adds, subtracts, multiplies, and divides using whole numbers, decimals, fractions, and integers; performs measurement of length, area, volume, weight, and temperature; uses ratios and proportions, percents, and roots; uses spatial relationships and basic concepts of geometry; makes estimates and approximations and judges the reasonableness of the results; understands and uses concepts of probability and statistics; organizes data into tables, charts, and graphs and interprets data presented in these forms; and uses a calculator to solve math-related problems.
Computer Skills	Uses keyboards to input data and information into a computer; uses a computer to operate instructional programs; and uses a computer to operate standard utility software programs such as word processing, spreadsheets, and statistical packages.

Information Processing Skills	Uses the features of books and other reference materials; uses standard library reference skills to locate and retrieve information; uses a computer to access information sources and data bases; and extracts, organizes, and summarizes information from data sources.
Core Concepts and Ideas (in four subject matter categories)	
Knowledge of Science	Includes the structure and function in organisms, evolution, interdependence of living things, change, stability and equilibrium in the universe, conservation of energy, matter, electrical charge, heat, momentum, side effects of technologies, symbolic representations and transformations, uncertainty and probability, equivalence.
Knowledge of Humanities	Includes culture, relationship of environment to human activity, location, place, region, artistic style, creative expression, choreography, and music elements.
Knowledge of Social Studies	Includes the structure and functions of political institutions, rights and responsibilities in rule of law, federalism, democracy, equality, geography, norms and mores, competition and market structure, and acculturation.
Practical Living Studies	Includes nutrition, health, substance abuse, housing, emotional stress, consumerism, parenthood, marriage, and work and employment.
Personal Attributes of Self-Sufficient Individual	Possesses a positive academic self-concept, maintains a healthy physical and mental lifestyle, is adaptable and flexible, resourceful and creative, self-controlled and disciplined, ethical, and can learn on his or her own.
Social Attributes of a Responsible Member of a Family, Work Group, or Community	Possesses interpersonal skills and team member skills, displays consistent and responsive caring behavior, recognizes rights and responsibilities of others, maintains a multicultural/world view, and maintains an open mind to alternative perspectives.
Thinking and Problem Solving	Identifies and formulates problems or develops a problem statement, identifies what is known and what needs to be known to address the problem, locates and organizes information, develops alternative solutions to problems, makes informed decisions in selecting a possible solution to the problem, and evaluates solutions.

Connecting and Integrating Knowledge	Makes connections with basic knowledge, identifies applications of knowledge in the real world, describes methods for advancing the knowledge or the field of knowledge in which the content belongs, describes the contributions or potential contributions of the knowledge to society, identifies personal relevance or potential personal relevance of the knowledge, and describes relationships of the new knowledge with other fields of knowledge.

Mexico's Occupational Analysis Study

This study is an extension of the National Job Analysis Study that was developed by ACT for the U.S. Department of Labor. The methodology surveyed a cross-occupational representation of the Mexican workforce using 191 workplace behavior statements to evaluate their importance and frequency in the work environment. The analysis of these common behavior statements led to the development of nine behavioral dimensions that describe basic workplace aspects that are common to a majority of occupations. From these behavioral dimensions, the study also identified nine essential knowledge and skill areas needed to perform the behaviors. The skill areas formed the basis for a national assessment to evaluate the attainment of these skills in the workforce. Summaries of the behavioral dimensions and the skill areas follow.

Behavioral Dimensions

Administration of Information

- Judge the quality, pertinence, importance, and authenticity of information from multiple sources to reach conclusions and recommendations to be taken.
- Understand information as a whole, identify implications, tendencies and patterns in information through reading or by means of computers or other technology.
- Locate, collect, process, and protect information and the creation of systems for safeguarding.
- Record, input, format, verify, store, and upkeep information.
- File and locate information using simple and direct methods such as alphabetical and numerical codes.

Coordination and Administration of Activities

- Evaluate personnel, project, operations and programs; design programs; establish program goals and determine activities to meet goals; recommend and carry out solutions to problems as necessary.
- Coordinate activities, operations and personnel; administer resources; identify priorities and supervise activities.
- Schedule, plan, and organize activities; make estimates of resources needed for an operation or activity; explain procedures to others to carry out duties.
- Make phone calls or prepare correspondence to arrange appointments or meetings; guide activities of the public or co-workers; arrange for permits and authorizations; schedule own activities.

	• Provide direct support for activities; prepare the work area or arrange for necessary materials for an activity.
Reading Materials for Information	• Read complex documents and compositions to analyze, evaluate, and solve problems and make decisions. • Read complex, routine documents to coordinate work activities, to inform others and make decisions. • Read various materials to obtain information to determine work to be carried out or how to repair machinery or equipment, interpret graphs, tables, and written instructions or directions. • Read work orders, instructions, memorandums, etc. to carry out activities correctly. • Read very simple materials to carry out activities correctly.
Attention to Clients	• Analyze and evaluate customer needs, make decisions on products/services or future markets, and design and recommend new products and services. • Explain advantages/disadvantages of products to clients, instruct clients through demonstration or using manuals to explain how equipment is used, negotiate with clients/suppliers or resolve differences in order to reach an agreement. • Contact clients to sell products/service, use client feedback to resolve problems or recommend direct actions. • Provide basic client assistance by listening to their needs and responding adequately, receive, order, select, and exhibit products and services. • Provide basic support to customers contact, including reception and orientation of clients at suitable places so that their problems may be solved and the preparation of areas to receive clients.
Communication	• Write and create presentations that inform, persuade or introduce new ideas or make proposals, draft technical reports or other specialized materials, including the translation of materials to other languages with accuracy. • Present information on how to carry out work operations, write manuals for a system, draw graphs and tables according to specifications, design programs for use in education and training. • Draft instructions on procedures, prepare tables and graphs to show information collected from different sources, use a second language for conveying instructions to others for carrying out an activity. • Record events, write basic correspondences, memorandums and e-mail messages so as to keep clients, suppliers and co-workers informed. • Copying and recording information, such as keeping inventory or preparing a client list.

Use of Technology	• Study, analyze, compare and evaluate different technological products, develop and design new technological systems. • Analyze working operations that require the use of technology. • Install, monitor, inspect, and diagnose problems in a technological system. • Select, prepare, adjust, and maintain equipment. • Use tools and measuring instruments to obtain basic information on a piece of equipment.
Interaction with Co-workers	• Participate in a team to explore and generate new ideas, develop new products or service or design new procedures for carrying out work activities. • Establish and achieve group goals, organize group activities, analyze and solve problems as a team, share information with others, and recommend actions to be taken. • Coordinate working hours, negotiate with other people on how work should be done, supply information on activities and operations so as to complete them with specified results. • Seek information or support from co-workers in order to complete work activities, informing supervisors or co-workers of problems at work. • Receive instructions from others or seek guidance about work activities from a supervisor.
Quantitative Operations	• Use mathematical models to evaluate information for the purpose of calculating the value of products and services in the market and to aid the organizational planning and technical development of products and services. • Conduct detailed quantitative and statistical analysis of financial allocation and resource information within an organization to make decisions about operations, personnel, products, and services. • Use mathematical formulas to prepare budgets, resolve work problems or assign resources and calculate costs of materials, supplies and services. • Use numbers, fractions, and percentages to keep accounts, prepare invoices, statements and receipts, and keep inventory, and weigh and measure items. • Use counting, addition, subtraction, multiplication, and division to put information in order or keep track of money.
Handling, Storing, Conservation, and Manufacturing of Materials and Products	• Evaluate existing systems and processes in order to develop new or improved processes and/or products. • Diagnose problems concerning processes and the installation of equipment to manufacture products and suggest solutions. • Manufacture, install, repair, and safeguard materials, products, installations, or equipment, as well as carry out tests on products' characteristics and conditions.

- Follow specifications or instructions when channeling materials, products, equipment or machinery.
- Follow procedures or instructions in order to undertake a specific task, including physical activities such as cleaning, loading, stacking, mixing, storing, and delivering materials and products.

Knowledge and Skill Areas

Reading

- Make generalizations beyond those of the given information so as to indicate the rationale as well as the implicit details.
- Use the context to grasp the meaning of words and apply information to situations that are not specifically described.
- Interpret explicit procedures and policies, understand the meaning of words that indicate order, position, time and other factors, find details and information in longer texts or obscured by complex sentences, combine information from different parts of the text, and outline steps to be taken in following procedures.
- Understand the main idea in a simple text, identify concrete information needed to complete a task, and identify the correct definition of a word used in a body of text.
- Recognize simple, commonly used words that are in daily life or that are essential for the job, and recognize basic personal information.

Writing

- Draft original written works (e.g., articles, technical reports, books) using correct grammar, spelling, and professional language suitable to the context.
- Use complex sentences and join ideas in a logical sequence so as to transmit information in work-related documents such as reports, manuals, and summaries.
- Write simple text with words commonly used on the job, convey ideas, and follow the rules of grammar and spelling to produce workplace documents such as minutes, memorandums, and letters.
- Write complete sentences with commonly used words and correct punctuation to relate messages in simple phrases.
- Communicate in writing using simple sentences or lists of words, write basic personal information or information pertaining to the job.

Mathematics

- Solve problems which entail four or more steps, decide which information is necessary for solution or if the information is incomplete or implicit, calculate indices such as production or price indexes, work with dimensional figures where the calculation requires dividing the figure in several regular figures to apply the correct formula, and detect errors in multiple-step calculations.

	• Eliminate unnecessary information to solve a problem, use set of formulas for the conversion of weights and measures, make calculations using different units, and select the appropriate information to perform two separate calculations and then compare the results.
	• Analyze information so as to determine what is necessary to solve the problem, what type of operations are needed and the sequence of steps to be followed, use averages in relation to sales, production, salaries, costs, and other data, and use proportions and ratios as models to solve problems.
	• Solve simple problems that require only one mathematical operation, deal with quantities and decision making by means of the information from cash registers, catalog prices and inventories.
	• Use basic numbers to solve a problem, recognize quantities, compare similar numbers and place numbers in logical order, and perform simple addition and subtraction.
Oral Communication	• Make presentations on a variety of subjects before different types of audiences, receive direct or indirect feedback accurately and give suitable replies to different speakers, and carry out interviews for the purpose of collecting information that is pertinent for decision making.
	• Understand and communicate information generated at group discussions, and communicate ideas persuasively and present subjects or concrete data to pre-identified groups.
	• Organize ideas and data so as to communicate clearly with others, formulate questions to receive new and additional information, and use basic technical language required in the workplace.
	• Initiate simple communication and ask for clarification of data or instructions, and ask pertinent questions of the right person.
	• Receive and understand simple verbal messages supported by some non-verbal information, answer direct questions, and confirm instructions and information.
Locating Information	• Make use of complex and extensive documents such as forms, maps and diagrams, handle different types of documents that contain less common terminology, symbols, and formats, clarify complicated data and interpret for specific ends or to apply data to a new situation.
	• Carry out a careful study for the recognition of tendencies, find the main ideas in a collection of data, and discriminate and select relevant information for a specific purpose from a large amount of information and apply it in similar situations.
	• Attend to matters generated by differences within or between documents, seek different items of information, make generalizations, take other sources of information as points of reference so as to confirm and clarify information, and

	consider the document's framework when making comparisons. • Use documents such as order forms, charts, tables, plans, and simple diagrams, locate information in the proper place, understand basic terminology used in the workplace, and find addresses on a map and interpret location of objects on a plan. • Handle simple documents which contain one or two items of information, follow a recording or filing method, use information such as titles and authors' names to locate information rapidly, recognize symbols, colors, or patterns to locate information, and identify common forms of data.
Applied Technology	• Use a wide range of complex tools and systems, foresee the outcome when applying principles that affect the properties of a given system, understand and interpret correctly the relationships between physical systems, use suitable diagnostic equipment, interpret information, form hypotheses and test them, use other means of non-visible symptoms, and take into account resources when making a decision. • Use complex systems, multiple tools, or systems operating at the same time or in sequence, solve problems using appropriate testing procedures that may require dismantling the system into parts, determine the best way to get the job done, and understand material properties to determine dangerous conditions. • Know how complex tools and systems operate and how they relate to one or more systems, use simple machines and systems for a specific purpose, apply more complex principles such as electrical current and water flow, and forecast the possible outcome if two or more variables are altered. • Know the basic operating principles of machinery and tools, use simple equipment if given instructions, use simple tools to solve basic problems. • Identify basic components and tools, and carry out basic tasks with simple tools and machinery.
Organizational Aspects	• Have knowledge of the organizing structure, functions, long-term plans, etc., of a business's operations and services, possess a vision of the organization and its function within the state, national and international economic contexts, and be committed to the most important objectives of the organization. • Consider the operation of the organization as one unit, understand the details of each unit and how each one affects the whole, be involved in greater tasks and duties that demand different resources and relationships between groups, use leadership to direct tasks, create new and improved methods within the company, be involved in every phase of customer relations, and understand economic tendencies and

	how they affect the organization and take advantage of these tendencies. • Be familiar with the general functions of an organization, knowing how it operates and the function of each group, work well in all groups, use basic management abilities in small groups to perform routine tasks, have knowledge of workplace procedures and regulations, supply information and services to clients, demonstrate greater commitment to the work and the organization, understand how the organization relates to the local market. • Aware of own job function and its relationship to the duties of others, make administrative decisions regarding time and resources that affect a person or a group, have basic knowledge of rules and procedures, and provide basic services to clients. • Aware of one's own work and job security, perform tasks without knowing their objective or the general results obtained.
Interpersonal/Social Skills	• Practice leadership and motivation to perform negotiation, persuasion, and promotion to achieve the desired goals, get and keep the confidence of those with whom they interact, promote the professional and personal development of peers and subordinates. • Respond adequately to diverse situations, accept personal doubts and criticism of their work with maturity, adapt easily to different socio-cultural characteristics, and resolve inter-personnel conflicts in the workplace. • Understand the diversity of opinions within a group, coordinate and propitiate a joint effort towards the achievement of objectives, show sensitivity to problems and moods of co-workers and offer help and support. • Show positive and cooperative attitudes at work, promote a favorable image of the company, adapt to changes in the work structure and procedures, be sensitive and support the ideas and suggestions of others, be trustworthy and responsible. • Maintain a respectful relationship with peers and superiors, show a willingness to listen to others without interrupting, respect the rights of others, and respect internal regulations regarding scheduling, work clothes, and security.
Decision Making	• Capable of evaluating and taking responsibility for decisions that may have long-term repercussions, relate probabilities of success or failure to economic and social costs, and make decisions conscientiously and systematically while under pressure and in a limited time period. • Take responsibility for decisions that affect part of the organization, suggest reversible and irreversible alternatives, identify probability of success or failure, identify economic

and organizational costs, and make decisions within a reasonable time period.

- Take responsibility for decisions that affect third parties, suggest alternatives with mid-term reversible effects, associate cost to a work team or to a process, and make decisions based on experience.
- Share responsibility within a group, identify up to four consequences of an alternative, and make decisions intuitively.
- Take responsibility for themselves and their activities, and make decisions based on pre-established criteria and carry them out by means of initiative.

Michigan Employability Skills

The Michigan State Board of Education identified skills Michigan employers want their workers to possess today and in the future. In November 1987, the Employability Skills Task Force identified generic skills that employers considered essential across a broad range of jobs. The task force identified skills in three core areas, and verified those skills in a survey of 7,500 Michigan employers. The employability skills are categorized as follows:

Academic Skills	Reads and understands written materials, understands charts and graphs, understands basic mathematics, uses mathematics to solve problems, uses research and library skills, uses specialized skill and knowledge to get a job done, uses tools and equipment, speaks in the language in which business is conducted, writes in the language in which business is conducted, and uses scientific methods to solve problems.
Personal Management Skills	Attends school/work daily and on time, meets school/work deadlines, develops career plans, knows personal strengths and weaknesses, demonstrates self-control, pays attention to details, follows written instructions and directions, follows oral instructions and directions, works without supervision, learns new skills, and identifies and suggests new ways to get the job done.
Teamwork Skills	Actively participates in a group, knows the group's rules and values, listens to other group members, expresses ideas to other group members, is sensitive to group members' ideas and views, is willing to compromise to best accomplish goals, operates as a leader or follower to best accomplish goals, and works in changing settings and with people of differing backgrounds.

The National Vocational Qualifications (NVQ)

In the United Kingdom, the NVQ is a national system of skill certification developed for occupations across the entire economy. The NVQ system is intended to cover all levels of skills in 11 different industry sectors, from entry-level to managerial jobs. Lead bodies set the standards for their industry, and Awarding bodies are associations that examine and validate standards and award certification attesting to competence. Described within the framework are "Core Skills" that refer to skills for all occupations.

Communication

Personal skills
- Improving own learning and performance
- Working with others

Numeracy
- Application of number

Problem solving

Information technology

Modern foreign language

The New Standards Project

The New Standards Project is being developed by the National Center on Education and the Economy and the Learning Research and Development Center at the University of Pittsburgh. The purpose of the project is to establish national standards in several subject areas together with a national, performance-based examination system to use as a means to gauge student, teacher, school and system performance. Along with standards for English language arts, mathematics, and science, the project includes a framework for applied learning (New Standards, 1994) that describes generic capabilities that are necessary for entering the world of work and civic participation. The framework describes nine skill and knowledge strands, each with three levels of performance. For the purpose of this report, Level 3 is listed.

Collecting, analyzing and organizing information	Defines the needs of audiences and the purposes of the information; Critically investigates sources to identify and distil relevant information; Identifies within information the main organizing categories and structures; and Evaluates the quality and validity of information.
Communication of ideas and information	Chooses the mode and form appropriate to a context and audience; Revises and evaluates the communication in the light of feedback; Varies style of presentation to suit a variety of contexts;

	Uses ideas to interpret and represent information in a variety of contexts; and Adapts ideas and information to unanticipated responses from audiences.
Planning and organizing resources	Incorporates strategic goals into the planning and organization of own work; Incorporates criteria for quality and efficacy of outcome into planning and organization of own work; and Incorporates goals, plans and priorities of a strategic nature into planning and organization of own work.
Working with others and in teams	Defines purposes and objectives to be achieved by working with others; Establishes roles, procedures and time frames taking into account different perspectives; and Negotiates with others to define objectives and, where necessary, to monitor and redefine them.
Mathematical ideas and techniques	Defines the purposes and objectives of the activity; Recognizes the assumptions which need to be made in order to apply an idea and technique; Adapts the idea and technique to fit the constraints of the situation; Makes decisions about the level of accuracy needed to resolve competing demands; and Interprets and evaluates methods and solutions.
Solving problems	Establishes major factors affecting processes and outcomes; Adapts and manipulates processes to achieve appropriate completion; Anticipates problems and opportunities, and the conditions under which they arise; and Establishes and uses criteria for judging effectiveness of processes and outcomes.
Using technology	Defines the purpose and objectives for the use of technology; Transfers technological principles to a new situation; Configures and manages a series of operations as process; Selects technological practices to maximize socially and ethically responsible use of technology; and Uses technological principles to reduce constraints presented by environs and physical capacity.
Understanding and designing system	Understands that quality of their work is a function of the work of others inside and outside the organization; Analyzes situations in ways that reveal understanding of how sequences of activities affect later possibilities, how decisions may interact, and how competing constraints can be optimized;

	Organizes work within the constraints of input received, time and equipment available and outputs expected to develop new patterns of work flow or different approaches to quality checking; Participates in design work and works with customers to develop or improve products; and Communicates and negotiates with teams of others who share an interest in the product or process.
Learning and teaching on demand	Self-assesses what one knows and what needs to be learned and finds good sources of information, including knowledgeable people; Develops an overview schema to guide one's study, poses and answers questions for oneself, elaborates on information so as to understand it better, seeks feedback on one's learning progress, and uses other processes to monitor and manage the learning process; Recognizes that colleagues may need help and knows how to offer help and support that does not offend; and Explains things to others in ways that take into account what the listener already knows and understands.

New York State Education Department

The New York State Education Department has identified a list of basic and advanced skills in three major areas. Although it is unclear how the skills were determined, the skill list was verified through a survey administered to approximately 300 small and large businesses to determine the level of skill required (i.e., levels 1 to 6) in each of the following areas:

Language Arts Skills	Listens/speaks for personal response, social interaction, information and understanding, critical analysis, and evaluation. Reads for aesthetic and personal response, acquisition, interpretation and application, critical analysis and evaluation. Writes for personal expression, social interaction, information and understanding, critical analysis and evaluation.
Mathematics	Performs basic operations, logic, probability, statistics, measurement, and algebra/geometry.
Expanded Basics	Demonstrates manual dexterity, reasoning, interpersonal skills, ability to work as a team member, use of information systems, setting of priorities, personal work skills and behaviors, and personal and civic responsibilities.

New Zealand's Essential Skills

In New Zealand, "Essential Skills" has formed part of the national curriculum and the National Qualification Framework. They include:

1) Information Skills
2) Communication Skills
3) Self-Management Skills
4) Work and Study Skills
5) Social Skills
6) Numeracy Skills
7) Problem-Solving and Decision-Making Skills

The Norback Job Literacy Structure

The Norback Job Literacy Structure, developed at the Center for Skills Enhancement, Inc., identifies 26 job literacy skills:

Quantitative	1) Format Problems
	2) Add and/or Subtract
	3) Multiply and/or Divide
	4) Other Arithmetic Processes
	5) Numbers and Counting
	6) Telling Time
	7) Linear, Weight, Volume, and Other Measures
	8) Scales and Other Gauge Measures
	9) Geometry
Document	10) Select
	11) Process Forms
	12) Process Illustrations
	13) Process Tables
	14) Process Graphs, Pie Charts, Bar Charts
Prose	15) Reading
	16) Reference Systems
	17) Vocabulary
	18) Writing, Grammar, Editing, Spelling
	19) Following Directions
	20) Identification
	21) Computer-Related Skills
	22) Synthesizing across Formats
	23) Contingent Decision-Making/Analysis/Troubleshooting
Basic Communication	24) Working with Other Parties in the Communication System
	25) Adjusting to the Limitations of Materials
	26) Communicating about Actions and Procedures

The PLATO Learning System

TRO's PLATO Learning System offers interactive, self-paced comprehensive instruction and testing specifically designed for adults and young learners in a variety of settings. PLATO is aligned to SCANS foundation skills and can be aligned to job-task analysis and workforce training initiatives. The PLATO WorkSkills courseware was designed to teach the specific reading, writing, mathematics, listening, and speaking skills required for success in today's workplace. The WorkSkills curriculum includes:

Reading for Information
Writing in the Workplace
Communication
Applied Math
Data Skills
Quality Fundamentals

Project BEL

"Project BEL" in Flint and Mount Morris, Mich., was initiated to link business, education, and labor together for identification of workplace literacy skills. From surveys conducted with employers, the following ten skill areas were identified:

1) Communications
2) Mathematics
3) Computer Literacy
4) Self-Awareness
5) Critical Thinking
6) Careers/Decision Making
7) Employability/Job Seeking
8) Interpersonal Skills
9) Learning How to Learn
10) Leadership and Organizational Effectiveness

The Quality of American High School Graduates: What Personnel Officers Say and Do about It

Johns Hopkins University completed a survey in 1984 that built on an earlier longitudinal study that followed the careers of 20,000 high school seniors who graduated in 1972. Employers who hired those students were sent a survey asking about traits and abilities they considered important in recruitment and hiring. Out of 5,493 individuals sampled, 1,912 returned the survey. The results were summarized by Crain (1984) and rank-ordered in terms of their importance to the employers sampled:

1) Being dependable; coming to work regularly and on time.
2) Exhibiting a proper attitude about work and supervision.
3) Being able to get along with others; being a good team member.
4) Reading materials as difficult as a newspaper; adult literacy.
5) Accurately adding, subtracting, multiplying, and dividing; basic arithmetic skills.

Other traits also mentioned are specialized knowledge, advanced reading, growth potential, supervisor potential, and proficiency in advanced mathematics.

Skill Demand, Changing Work Organization, and Performance

A study by Capelli and Rogovsy in 1994 presented data from workers and their supervisors about the importance of various skills, their contribution to job performance, and the relationship between new systems of work organization (e.g., high performance) and skill requirements. The study concluded that basic academic skills are perceived as more important for improving performance by both employees and supervisors, deficits in them are associated with poor overall job performance, and the perceived need to improve these skills is associated with more positive attitudes and behaviors. The study also reports that job redesign with higher level tasks does seem to raise the skill needs, while worker empowerment and team work (e.g., high performance) do not. The skill emphasized by both was interpersonal skills. The basic skills and competencies used in the study are as follows:

Foundation Skills	Basic Reading and Mathematical Skills
	Communication Skills -- speaking, listening, and writing
	Thinking Skills -- problem-solving, reasoning, thinking creatively
	Personal Qualities -- responsibility and self-management
Workplace Competencies	The Ability to Work with Others
	The Ability to Work in Teams
	The Ability to Teach
	The Ability to Allocate Materials, Money, Space or Staff
	The Ability to Acquire and Evaluate Data, Interpret and Communicate Findings from Data
	The Ability to Understand Systems of Technology or Organization, Make Changes and Improve Such Systems
	The Ability to Select Appropriate Equipment and Tools that Apply to Specific Tasks

Survey of Employers in Los Angeles and Torrance, California

This survey, conducted by Wilfred Wilms in 1983, asked employers to identify the attributes they sought in workers. According to the survey results, 42 percent of the employers valued education and good attitudes and habits. Only 5 percent stated that credentials ensure better job skills.

Survey of San Francisco Employers

This survey, reported in 1983, asked San Francisco area employers to identify desirable entry-level characteristics of young applicants. The top characteristics follow:

1) Applicant seemed serious about work and eager to get the job
2) Applicant seemed bright and alert
3) Applicant seemed courteous and personable

4) Applicant seemed to have the ability to learn quickly
5) Applicant had a neat appearance and appropriate dress
6) Applicant had good reading ability and ability with numbers
7) Applicant had a "record of achievement in school"

Teaching the New Basic Skills

Murnane and Levy (1996) reported on the "New Basic Skills" needed by all high school students to get a middle-class job in a rapidly changing economy. They looked at firms employing high school graduates and how these firms selected applicants for hire. They looked at the hiring criteria and how the applicant scored on that criteria, and how that score was associated with subsequent job performance success (e.g., raises and promotions). They found six skills assessed at time-of-hire which turned out to be associated with middle-class wage on the job over time:

The ability to read at the ninth-grade level or higher.
The ability to do math at the ninth-grade level or higher.
The ability to solve semi-structured problems where hypotheses must be formed and tested.
The ability to work in groups with people of various backgrounds.
The ability to communicate effectively, both orally and in writing.
The ability to use personal computers to carry out simple tasks like word processing.

Texas Workplace Skills Inventory

The Texas Workplace Skills Inventory covered "workplace know-how," described as SCANS foundation skills and competencies. An inventory was distributed in 1995 to over 2,000 employers asking them to rate whether the skills were needed at an advanced level, at a moderate level, at a minimum level, or not a necessary work skill. A total of 812 completed the inventory. The following skills were determined to be the most essential for entry-level employees to possess. The skills are ranked highest to lowest.

Exhibits trust/honesty
Exhibits appropriate behavior when dealing with clients
Works well with people form culturally diverse backgrounds
Reports emergencies
Comprehends/acts appropriately on spoken instruction
Asks questions when appropriate
Understands written sequential directions
Follows directions in personnel policy manual
Manages one's time on tasks
Understands policy manuals
Interacts with co-workers to accomplish a task
Checks/edits one's own work
Considers risks and provides for safety for self and others in work environment

Training America, Strategies for the Nation

In this report, issued by The National Center on Education and the Economy and The American Society for Training and Development in 1989, employers identified the need for a high level of basic skills in workers, as well as personal management attributes, including self-esteem, goal-setting skills, and motivation. Employers also noted that to function in autonomous teams, workers need a high level of interpersonal teamwork skills, negotiation skills, and organizational effectiveness skills (e.g., leadership).

Vocational-Technical Consortium of States (VTECS)/Illinois

As one of many state projects for VTECS, Illinois established an initial commerce and industry advisory group in September 1991 to identify workplace competencies critical for all employees. The initiative was in response to commerce and industry focus groups held around Illinois, national reports such as SCANS, and requirements of the 1990 Carl Perkins legislation. The Illinois advisory board, consisting of representatives of large and small businesses from rural and urban settings, compiled a list of required competencies. Employers in the other 22 VTECS member states reviewed the competency list and provided input. The information from other employers was reviewed by the Illinois advisory group and incorporated into the final listing. The skills were grouped into the following 13 competency areas with illustrative behaviors:

Developing an Employment Plan	Matches interests to employment area, matches aptitudes to employment area, identifies short-term work goals, matches aptitudes, personality type, and physical capabilities to a job area; identifies career counseling sources including entrepreneurship; and demonstrates a drug-free status.
Seeking and Applying for Employment Opportunities	Identifies the hiring practices of employers, prepares a list of employer contacts, utilizes networking techniques, identifies professional/trade journals and newsletters, identifies local, county, and/or state employment newsletters and services, locates job openings, recognizes the employee's role in business success, identifies employment trends, identifies occupational opportunities for a job, identifies conditions of employment for a job, locates resources for finding employment, prepares/develops a resume, identifies and implements interviewing techniques, evaluates specific job opportunities, applies for specific jobs, writes job application letter, writes follow-up letter, completes job application form, dresses appropriately for an interview, and effectively participates in an interview.
Accepting Employment	Applies for a social security number, fills out personnel forms for employment, fills out insurance application forms, fills out federal and state tax forms, fills out personal history forms, fills out union and professional group membership forms, accepts/rejects employment offers, and selects employment benefit options.
Communicating on the Job	Uses correct grammar, communicates verbally with others, writes legibly, uses a telephone properly, uses body language effectively, listens, follows written and oral directions, asks questions, and prepares written communications.

Interpreting the Economics of Work	Identifies the role of business in the economics system; describes the responsibilities of employees, management, and employers; investigates opportunities and options for business ownership, and assesses entrepreneurial skills.
Maintaining Professionalism	Participates in employment orientation in a positive and constructive manner, demonstrates knowledge of the company's image and products/services, exhibits positive behavior, exhibits courtesy, respects the jobs of other workers, complies with company standards for dress and appearance, demonstrates personal hygiene and cleanliness, participates in meetings in a positive and constructive manner, complies with organizational expectations, uses job-related terminology, and treats people with respect.
Adapting to/Coping with Change	Identifies the elements of the job transition, recognizes the uniqueness of distinct work settings, accepts uncertainties of the transition phase, evaluates coping resources, identifies methods to manage transition, completes job assignments, formulates transition plans, implements a transition plan, adjusts career goals/plans, evaluates effectiveness of the transition plan, exhibits ability to handle pressures and tension, recognizes the need to change/quit a job, and writes a letter of resignation.
Solving Problems and Critical Thinking	Identifies the problem, assesses values and norms, identifies attitudes and beliefs, clarifies purposes and goals, identifies available solutions and their impact, employs reasoning skills, evaluates options, sets priorities, selects and implements options/decisions, prioritizes work assignments, and assesses employer/employee responsibility in solving a problem.
Maintaining Safe and Healthy Work Environment	Complies with safety and health rules and procedures, uses and maintains proper tools and equipment, follows conservation/environmental practices and policies, responds during emergencies, maintains work area, and identifies hazardous substances in the workplace.
Demonstrating Work Ethics and Behavior	Implements responsibilities of job position; follows rules, regulations, and policies; practices cost effectiveness; practices time management; assumes responsibility for personal decisions and actions; exhibits pride; displays initiative and assertiveness; applies ethical reasoning; and seeks work challenges.
Demonstrating Technological Literacy	Demonstrates basic computer keyboard skills, utilizes computer skills, and recognizes the impact of technological changes on tasks and people.
Maintaining Interpersonal Relationships	Values individual diversity, responds appropriately to praise and criticism, provides constructive praise

	and criticism, constructively controls emotional responses, resolves conflict, displays a positive attitude, and identifies and reacts appropriately to sexual harassment.
Demonstrating Teamwork	Identifies style of leadership required for effective teamwork, works productively with others, establishes the team's operating procedures, and evaluates outcomes.

Washington Basic Skills

The State of Washington, through its participation in the Center for Remediation Design's Project of the States, developed a Washington Basic Skills Index consisting of 13 skill domains under the areas of Reading, Mathematics, and Oral Communication:

Reading Comprehension for Employment

Following Directions	Reads labels, work instructions, maps, procedural manuals, product instructions, safety warnings, road/street signs/symbols, directions on a test; and determines sequential events/items.
Looking Up and Obtaining Information	Alphabetizes, uses a dictionary, and reads abbreviations, classified advertisements, job advertisements, dictionaries, telephone books, work-related schedules, policy manuals, job announcements, and computer printouts.
Filling Out Forms and Documents	Completes job applications, telephone message forms, order forms, employment forms, and education and training applications.
Understanding Financial and Legal Documents	Understands personal bills, tax forms, insurance forms, legal notices, contracts/agreements, business invoices, warranties, utility bills, and financial forms.
Problem Solving	Prioritizes work/life tasks, sorts/categorizes things and information, schedules/orders events, and identifies work-related problems and possible solutions.

Math Computations

Computations	Adds, subtracts, multiplies, and divides whole numbers, fractions, and decimals.
Estimates	Determines averages, makes approximations by rounding numbers, determines ratios, and judges reasonableness of numerical responses.
Concepts	Converts fractions to decimals and vice-versa, changes percents to decimals and vice-versa, and determines percentages.

Measurements	Demonstrates knowledge of the metric system, changes units of measure, uses measuring instruments, recognizes simple plane geometric figures and common solid geometric figures, finds perimeters, rectangular areas, and volume, determines dry and liquid measures, and tells time.
Problem Solving	Calculates time, allocates time, uses a calculator, balances bank statements and reconciles checkbook, makes bank deposits, allocates money, inventories goods or stock, makes change, calculates mileage, determines weight and measure, compares unit prices, verifies accuracy of paycheck stubs, reads and interprets tables and charts, and plots and interprets graphs.

Oral Communication

Listening	Identifies basic elements of communication, uses attentive posture and maintains eye contact while listening, receives spoken instructions in the workplace, and distinguishes secondary methods of communication.
Giving Information	Gives spoken instructions in the workplace, explains ideas from a work plan and options for implementation, interviews for a specific job, reports an emergency, chooses words/manner of expression appropriate to the workplace, communicates on the telephone, places orders, and explains products and services.
Persuading and Negotiating	Handles complaints, and interacts with co-workers to accomplish tasks.

Washington Workplace Competency Worksheet

Education, business and labor groups in the state of Washington have been involved in a major effort to identify basic workplace competencies. The State Board for Community and Technical Colleges, the Office of the State Superintendent of Public Instruction, the Association of Washington Business, and the State Labor Council have identified a core of related workplace competencies necessary for occupations from entry-level to technical. A "Workplace Competency Worksheet" was developed to gather information from business and labor leaders about whether the competencies are essential for employees entering the new internationally competitive workforce. Respondents also were asked to assess the level of education at which the competency would be expected. The survey contains the following competency areas:

Reading	Locates, understands, and interprets information written in English prose and contained in technical documents (manuals, graphs, and schedules), determines the main idea in text, identifies relevant details, facts, and specifications, recognizes biased information, and evaluates the accuracy, appropriateness, style, and plausibility of reports, proposals, and theories of other writers.

Writing	Communicates thoughts, ideas, information, and messages in writing, writes or types legibly and clearly, records information completely and accurately, composes and creates documents such as letters, directions, and reports, creates graphs and flowcharts, uses language, style, organization, and format that are appropriate to the subject matter, purpose, audience, etc., and edits, revises, and corrects information.
Arithmetic	Performs basic computations and uses basic numerical concepts such as whole numbers and percentages on a calculator if required, uses expressions, equations, and formulas, determines measurements, performs basic statistics and probability, solves problems, computes money (e.g., prepares a check, makes change, balances a cash drawer, makes a bank deposit).
Mathematics	Approaches practical problems by choosing appropriately from a variety of mathematical techniques, uses quantitative data to construct logical explanations for real-world situations, and expresses mathematical ideas and concepts orally and in writing.
Listening	Receives, interprets, and responds to verbal messages and other cues in ways that are appropriate to the purpose, comprehends and critically evaluates the speaker, hears the key points that make up a customer's concerns, conveys an adequate response, and works effectively with customers, receives and responds to oral instructions, interprets and responds to nonverbal cues, and uses proper telephone techniques when communicating with others.
Speaking	Speaks clearly and communicates a message, selects an appropriate medium for conveying information, provides information in a manner appropriate to the setting, presents clear and focused arguments to support position on issues, persuades others to take the desired course of action, and responds appropriately to feedback.
Thinking Skills	Demonstrates creative thinking in making decisions, solving problems, and reasoning; locates, organizes, and applies information correctly; thinks convergently and divergently; and uses critical, creative, and intuitive evaluation skills.
Creative Thinking	Identifies situation-related problems and their causes; chooses, evaluates, and modifies solutions as needed and determines consequences; combines ideas or information in new and imaginative ways; makes connections between seemingly unrelated ideas and reshapes goals in ways that reveal new possibilities; and visualizes and thinks conceptually.

Decision Making	Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative; makes decisions regarding the safety of workers and the workplace; and is able to "think on feet."
Problem Solving	Devises innovative solutions when needed, recognizes and defines problems, invents and implements solutions, and tracks and evaluates results; examines problems in innovative ways; understands the value of consensus building in problem-solving; listens to others' viewpoints regarding a course of action; considers such factors as ethnic diversity in effective decision-making; approaches and analyzes problems systematically; discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem; uses logic to draw conclusions from available information; extracts rules or principles from a set of objects or written text; and applies rules and principles to new situations or determines which conclusions are correct when given a set of facts and a set of conclusions.
Knowing How to Learn	Is aware of learning tools such as personal learning styles, uses learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations, employs formal and informal learning strategies, and learns a particular skill of an available job.
Personal Qualities	Demonstrates individual responsibility, sociability, self-management, and integrity, recognizes and improves capacities to judge and balance appropriate behavior, copes with undesirable behavior in others, handles stress, deals with ambiguity, shares responsibility, interacts with others, understands the need to handle multiple responsibilities, is able to change, assumes responsibility for personal performance, understands the value of honesty, appreciates health and fitness, and understands the value of ethnic and gender equality in the workplace.
Responsibility	Exerts a high level of effort and perseverance toward goal achievement, organizes time and materials, works hard to become proficient by setting high standards, pays attention to detail, displays a high level of concentration, values attendance and punctuality, displays enthusiasm, vitality, and optimism in approaching and completing tasks, values diversity, respects differences in point of view and lifestyle, understands the benefits of negotiation, and identifies personal work values and goals.
Self-Esteem	Believes in self-worth and maintains a positive view, demonstrates knowledge of own skills and abilities, knows own emotional capacity and needs and how to address them, understands how one's self-esteem affects performance, can learn from the mistakes of others, accepts praise and criticism, states

	personal needs clearly, channels emotional reactions constructively, takes risks, and demonstrates friendliness, adaptability, empathy, and politeness in new and ongoing groups.
Self-Management	Demonstrates the ability to access own knowledge, skills, and abilities, sets realistic and attainable goals, monitors progress toward goals, is a self-starter, and manages anger.
Interpersonal and Group	Participates effectively in collaborative decision-making, serves as a skilled team member, serves as a teacher of new workers, negotiates with others to solve problems or reach decisions, works effectively with colleagues from diverse backgrounds, responsibly challenges existing procedures, identifies attainable and realistic long-term job needs that motivate personal growth, understands concepts of teamwork, courtesy, and cooperation, identifies and assesses role and norms in a team, understands different work environments and effects on team, demonstrates effective interteam communication, and understands own work in the context of the work of those around him or her.
Information	Prepares, maintains, and interprets quantitative and qualitative records, converts information from one form to another to convey information (oral and written) as needed, identifies the appropriate source of information for job opportunities, and understands the use of general work-related vocabulary.
Technology	Displays a basic level of competence in selecting and using technology, visualizes operations, uses technology to monitor tasks, and maintains trouble-shooting of complex equipment; understands and handles diverse communication technologies; uses a computer for personal or work purposes; and is conversant with commonly applied technologies in various workplace applications.
Sense of Organization Purpose	Senses where the organization is headed and what must be done to make a contribution, interprets written and unwritten values and goals of different types of organizations, determines compatibility of personal and organizational values, understands urgency in an organizational setting, and understands the concept of confidentiality in an organizational setting.

Work Keys®

The Work Keys system from ACT is a national system for documenting and improving generalizable workplace skills. Working with charter states, national education organizations, educators, employers, and experts in employment and training requirements, ACT identified workplace skills that help individuals successfully perform a wide range of jobs. These skills form the basis of the Work Keys system and include Applied Mathematics, Applied Technology, Listening, Locating Information, Observation, Reading for Information, Speaking, Teamwork, and Writing. The skills are defined as follows:

Applied Mathematics	Regardless of skill level, Work Keys math problems involve one or more of the following applications: A. Quantity B. Money C. Time D. Measurement E. Proportions and Percentages F. Averages
Applied Technology	The Work Keys Applied Technology skills require the following: A. A working understanding of technological principles commonly applied in the service, retail, and manufacturing sectors. B. The ability to apply problem-solving techniques.
Listening	The listening skills targeted by Work Keys may be grouped into the following general categories: A. Literal comprehension B. Interpretation C. Critical listening
Locating Information	The Work Keys Locating Information skills involve the use of one or more related graphics, such as tables, graphs, and diagrams, to locate, insert, compare, and summarize information. At the highest level, Locating Information includes the ability to make decisions, apply information, and draw conclusions based on information contained in one or more graphics.
Observation	The Work Keys Observation skills may be grouped in the following general categories: A. Visual and auditory perception and integration B. Memory C. Whole-part-whole D. Logic
Reading for Information	The Work Keys Reading for Information skills can be grouped into four categories: A. Choosing main ideas or details B. Understanding word meanings C. Applying instructions D. Applying information and reasoning

Teamwork	The Work Keys Teamwork skills can be grouped into two categories. At the lower levels, these categories are somewhat separate; at the higher levels, they interact. A. Task skills B. Relationship skills
Writing	The Work Keys Writing skills can be grouped into the following categories: A. Grammar B. Punctuation and spelling C. Organization D. Style

Workforce Development Region IX Needs Assessment Survey Report

In June 1997, a survey was mailed to local businesses to help the area's Workforce Development Centers effectively meet the area's employment and training needs. A total of 154 business with Region IX responded. As part of the survey, each business was asked which skills were needed for entry-level positions and which skills were needed for current workers to handle future changes. The results of the survey are listed below:

	Percent of Cases Reported	
Skills	**Entry Level Positions**	**Current Workers**
Reading	91.2	68.1
Writing	84.5	68.1
Computation/Math	80.4	74.8
Problem Solving	73.0	79.8
Teamwork	85.1	83.2
Work Habits	92.6	73.9
Interpersonal Skills	75.0	78.2
Technical Skills	53.4	62.2
Computer Skills	53.4	68.1
ESL	14.9	16.8
Knowledge of Gov. Reg.	16.9	31.9
Critical Thinking	41.2	57.1
Global Understanding	9.5	15.1
Other* (not specified)	5.4	5.9

Workforce LA

Workforce LA, an initiative in Los Angeles, CA, was formed in 1990 to develop a comprehensive system that would integrate education, training, and job placement. The initiative focused on what capabilities employers want in their workers. The result was the identification of the following four major areas:

Trainability:	Employees who can adapt to the changing workplace, learn new information quickly, and possess job-specific knowledge.
Basic Skills:	Employees who can read, write and compute, and have good interpersonal and critical-thinking skills.
Work Ethic and Workplace Expectation Skills:	Employees who demonstrate self-discipline, attend work regularly, and are punctual.
Social Maturity:	Employees who are cooperative and can work in culturally diverse workplaces.

Workplace Basics (Carnevale)

In 1986, researchers at ASTD began a project to identify the skills employers say are basic to success in the workplace. The project was underwritten by a grant from the DOL. The result of the research is a basic skills hierarchy consisting of seven skill groups. The hierarchy is outlined in two publications: Carnevale, A.P., Gainer, L.J., Meltzer, A.S., & Holland, S.L. (1988), Workplace Basics: The Skills Employers Want; and Carnevale, A.P., Gainer, L.J., & Meltzer, A.S. (1990), Workplace Basics. The hierarchy begins with the most fundamental skill group and ascends to the most advanced. The skill groups are described below, from lowest on the hierarchy to highest, along with comments from the authors about application of the skills.

Learning to Learn	Individuals must have the ability to rapidly acquire new skills and information that applies to the workplace. To remain competitive, American workers must be able to quickly pick up and assimilate new facts for solving workplace problems. According to the researchers, this foundation skill is essential for acquisition of all the subsequent skill groups on the hierarchy.
The 3 Rs of Reading, Writing, and Computation	The reading, writing and computation taught in school must be adapted to the requirements of the workplace. Workers must read to locate information, and must analyze and monitor their own reading level. Writing in the work context also demands creativity, analysis, conceptualization, and the ability to articulate ideas clearly in written format. Computation focuses on problem identification, reasoning, estimation procedures, and problem-solving.

Communication: Listening and Oral Communication	In the high performance organization, workers must be able to quickly articulate and express their ideas. They must be able to listen effectively to customers and co-workers and to respond appropriately.
Adaptability: Creative Thinking/Problem Solving	Workers must be able to look at old problems in new ways, and approach them with flexible solutions. Encouraging workers to think creatively and solve problems promotes work involvement, motivation, and decision-making activities.
Personal Management: Self-Esteem, Goal-Setting/Motivation, Employability, Career Development	The most productive workers are those who have a strong positive belief in their abilities, set realistic and attainable goals, and are interested in career development and growth opportunities.
Group Effectiveness: Interpersonal/Negotiation/Teamwork	Workers today must be capable of communicating effectively with others, negotiating to resolve conflict, and working with others as a team to achieve organizational and personal goals.
Influence: Organizational Effectiveness/Leadership	This skill group, the highest in the hierarchy, refers to the ability to make a positive impact on an organization and others, and to assume leadership responsibilities as necessary. Today's worker must understand an organization's goals, operations, values, and culture to better determine how to operate in that system. The worker must also understand how to navigate in the system and influence others in positive ways.

Young People's Participation in Post-Compulsory Education and Training

In Australia, the Finn Committee concluded in the report, Young People's Participation in Post-Compulsory Education and Training (1991), that there are certain essential skills that all young people need to learn in their preparation for employment. The report identified the following six "Key Competencies."

1) Language and Communication
    - Speaking
    - Listening
    - Reading
    - Writing
    - Accessing and using information

2) Mathematics
    - Computation
    - Measurement
    - Understanding mathematical symbols

3) Scientific and Technological Understanding
   - Scientific and technological concepts
   - Impact of science and technology
   - Scientific and technological skills

4) Cultural Understanding
   - Australia's context
   - Global issues
   - World of work

5) Problem Solving
   - Analysis
   - Critical thinking
   - Decision making
   - Creative thinking
   - Skills transfer to new contexts

6) Personal and Interpersonal
   - Personal management
   - Negotiating, team skills
   - Initiative, leadership
   - Adaptability to change
   - Self-esteem
   - Ethics

Appendix B

Crosswalk Tables

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Resources	*Resource Management Skills*	
Allocates Time - Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules. Demonstrating competence includes properly identifying tasks to be completed; ranking them in order of importance; developing and following an effective, workable schedule based on accurate estimates of such things as importance of tasks, time to complete tasks, time available for completion, and task deadline; avoiding wasting time; and accurately evaluating and adjusting a schedule.	**Time Management** - Can manage own and other people's time, prioritizing, judging level of effort, identifying critical periods and allocating other people's time to key tasks. Managing one's own time and the time of others.	Strong match.
Allocates Money - Prepares budgets, makes cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments. Demonstrating competence includes accurately preparing and using a budget consistent with accounting methods, accurately calculating future budgetary needs based on projected costs and revenues, accurately tracking the extent to which actual costs and revenues differ from the estimated budget, and taking appropriate and effective actions.	**Management of Financial Resources** - Obtains monetary or budget support for various projects; allocating funds to these projects and accounting for expenditures. Determining how money will be spent to get the work done and accounting for these expenditures.	Strong match.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Allocates Materials and Facility Resources - Acquires, stores, and distributes materials, supplies, parts, and equipment, space, or final products to make the best use of them. Demonstrating competence includes carefully planning the steps involved in the acquisition, storage, and distribution of resources; safely and efficiently acquiring, transporting, or storing them; maintaining them in good condition; and distributing them to the end user.	**Management of Material Resources** - Obtains and allocates equipment, facilities, and materials needed to do a job ensuring its maintenance and overseeing its use. Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.	Strong match.
Allocates Human Resources - Assesses knowledge and skills and distributes work accordingly, evaluates performance and provides feedback. Demonstrating competence includes accurately assessing an individual's knowledge, skills, abilities, and potential; identifying present and future workloads; making effective matches between individual talents and workload; and actively monitoring performance and supplying feedback.	No Equivalence.	Partial link to O*NET Management of Personnel Resources. The subtle difference between these two definition is that O*NET emphasizes more supervision and direction of personnel, while SCANS emphasizes match skills to appropriate tasks.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Information		
Acquires and Evaluates Information - Identifies need for data, obtains them from existing sources or creates them, and evaluates their relevance and accuracy. Demonstrating competence includes posing analytic questions to determine specific need for information, selecting possible information and evaluating its appropriateness, and determining a need for new information.	No Equivalence.	The context of "information" is presented differently in the SCANS frameworks versus the O*NET framework. SCANS constructed skill categories that address specific activities related to using information. O*NET distributed the use of information across many of its skill area definitions. For the SCANS skill of "acquiring information," there is a partial link to O*NET Complex Problem Solving Skill "Information Gathering" and System Skill "System Evaluation."
Organizes and Maintains Information - Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion. Demonstrating competence includes understanding and organizing information from computer, visual, oral, and physical sources in readily accessible formats (e.g., computerized databases, spreadsheets, microfiche, videodiscs, paper files); and transforming data into different formats to organize them by the application of sorting, classifying, or more formal methods.	No Equivalence.	(See comments for SCANS "Acquiring and Evaluating Information." For the SCANS skill of "organizing information," there is a partial link to O*NET Complex Problem Solving Skill "Information Organization.")

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Interprets and Communicates Information - Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multimedia methods. Demonstrating competence includes determining the information to be communicated, identifying the best methods to present the information (e.g., overheads, handouts), and converting the information to a desired format when conveying it to others (e.g., oral, written).	No Equivalence.	(See comments for SCANS "Acquiring and Evaluating Information." There is no appropriate link to O*NET.)
Uses a Computer to Process Information - Employs a computer to acquire, organize, analyze, and communicate information. Demonstrating competence includes entering, modifying, retrieving, storing, and verifying data and other information; choosing a format for displaying information (e.g., line graph, bar graph, tables, pie charts, narrative); and ensuring the accurate conversion of information into a chosen format.	No Equivalence.	(See comments for SCANS "Acquiring and Evaluating Information." There is no appropriate link to O*NET.)

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Interpersonal	*Social Skills*	
Participates as a Member of a Team - Works cooperatively with others and contributes to a group with ideas, suggestions, and effort. Demonstrating competence includes doing one's own share of tasks necessary to complete a project, encouraging team members by listening and responding appropriately to their contributions, building on individual team members' strengths, resolving differences for the benefit of the team, taking personal responsibility for accomplishing goals, and responsibly challenging existing procedures, policies, or authorities.	No Equivalence.	Partial link to O*NET Coordination. However, SCANS emphasizes the proactive part of being involved in a team and working as a team member. Although O*NET Coordination is a condition of working in a team, it has broader applications beyond just teams. "Coordination" alone does not equal Participates as a Team Member.
Teaches Others - Helps others to learn. Demonstrating competence includes assisting others in applying related concepts and theories to tasks through coaching or other means, identifying training needs, conveying job information in an effort to allow others to see its applicability and relevance to tasks, and assessing performance and providing constructive feedback and reinforcement.	**Instructing** - Can develop the skills of others attending to their needs and current level of mastery. Teaching others how to do something.	Strong match.
Serves Clients/Customers - Works and communicates with clients and customers to satisfy their expectations. Demonstrating competence includes actively listening to customers to identify needs and avoid misunderstandings, communicating in a positive manner, especially when handling complaints or conflict; and efficiently obtaining additional resources to satisfy client needs.	**Service Orientation** - Attempts to provide others with needed services anticipating their needs and responding to their concerns. Actively looking for ways to help people.	Strong match.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Exercises Leadership - Communicates thoughts, feelings, and ideas to justify a position, encourage, persuade, convince, or otherwise motivate an individual or group, which includes responsibly challenging existing procedures, policies, or authority. Demonstrating competence includes making positive use of rules/values followed by others, justifying a position logically and appropriately, establishing credibility through competence and integrity, and taking minority viewpoints into consideration.	No Equivalence.	Partial link to O*NET Persuasion, yet SCANS has specific implications to leading others. "Persuasion" is a part of leadership, but the definition lacks reference to motivating others and the personal characteristics and responsibilities of leading others.
Negotiates to Arrive at a Decision - Works toward an agreement that may involve exchanging specific resources or resolving divergent interests. Demonstrating competence includes resolving conflicts, adjusting quickly to new facts/ideas, proposing and examining possible options, and making reasonable compromises.	**Negotiation** - Can bargain as a representative of others or can bargain for oneself in situations calling for a transaction. Bringing others together and trying to reconcile differences.	Strong match.
Works with Cultural Diversity - Works well with others regardless of gender, ethnic, social, and/or educational differences/similarities. Demonstrating competence includes understanding one's own culture, that of others, and how they may differ; respecting the rights of others while helping them to make cultural adjustments when necessary; avoiding the use of stereotypes and bias; and being understanding of the concerns of members of other ethnic and gender groups.	No Equivalence.	Partial link to O*NET Social Perceptiveness. SCANS Works with Cultural Diversity specifically emphasizes relating to gender, ethnic, social, and educational issues, which is implied in O*NET Social Perceptiveness but not explicitly stated.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Systems	*System Skills*	
Understands Systems - Knows how social, organizational, and technological systems work and operate. Demonstrating competence includes understanding how a system's structure relates to goals, responding to the demands of the systems/organization, knowing the right people to ask for information and where to get resources, and understanding how to function within the formal and informal codes of the social/organizational system.	**Visioning** - Create and apply a cognitive template or mental model describing how components of a system should interact under ideal conditions. Developing an image of how a system should work under ideal conditions. **System Perception** - Understands how various components of a system work together and monitor key diagnostics to identify changes in system states and the nature of operations. Determining when important changes have occurred in a system or are likely to occur. **Identification of Downstream Consequences** - Can identify the effects on different systems of a change in a given variable and how these changes will effect operations over time. Determining the long-term outcomes of a change in operations.	Strong match to the combined O*NET skill areas. (Note: Because a one-to-one match does not exist, a crosswalk at the scale level was not developed.) (For "Visioning," see comments for SCANS "Seeing Things in the Mind's Eye.") One small difference in these skill areas is the implication of change over time. This idea is explicit in O*NET but not in SCANS.
Monitors and Corrects Performance - Distinguishes trends and predicts the impact of actions on system operations, diagnoses deviations in the function of the system/organization, and takes the necessary action to correct performance. Demonstrating competence includes identifying trends and gathering needed information about how the system is intended to function, detecting deviations from the system's intended purpose, troubleshooting the system, and making changes to rectify the system function and to ensure product quality.	**Identification of Key Causes** - Can identify those variables that have the strongest effects on systems operations and the variables to be manipulated to bring about desired outcomes. Identifying the things that must be changed to achieve a goal. **System Evaluation** - Actively seeks out multiple sources of information about different system outcomes appraising the potential biases in this information and acting accordingly. Looking at many indicators of system performance taking into account their accuracy.	Strong match to the combined O*NET skill areas. (Note: Because a one-to-one match does not exist, a crosswalk at the scale level was not developed.) (See comments for SCANS "Acquiring and Evaluating Information." The O*NET skill of "System Evaluation" is related to SCANS "Acquiring and Evaluating Information.")

BEST COPY AVAILABLE

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Improves and Designs Systems - Makes suggestions to modify existing systems to improve products and services and develops new or alternative systems. Demonstrating competence includes making suggestions and recommending alternative system designs based on relevant feedback, and responsibly challenging the status quo to benefit the larger system.	No Equivalence.	Partial link to O*NET Technology Design.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Technology	*Technical Skills*	
Selects Technology - Judges which set of procedures, tools, machines, and computers will produce the desired results. Demonstrating competence includes determining desired outcomes and applicable constraints, visualizing the necessary methods and applicable technology, evaluating specifications, and judging which machine or tool will produce the desired results.	**Operation Analysis** - Identifies the requirements for a new technology including user needs, product requirements, and production, or operating, requirements of a system, tool, or type of technology. Analyzing needs and product requirements to create a design. **Equipment Selection** - Identifies the kind of technology, equipment or tools available most likely to satisfy user requirements in a cost-effective fashion. Determining the kind of tools and equipment needed to do a job.	Strong match to the combined O*NET skill areas. (Note: Because a one-to-one match does not exist, a crosswalk at the scale level was not developed.)
Applies Technology to Task - Understands the overall intent and proper procedures for setting up and operating machines, including computers and their programming systems. Demonstrating competence includes understanding how different parts of machines interact and how machines interact with broader production systems, installing machines including computers, setting up machines or systems of machines, and accurately interpreting machine output to include errors from program output.	**Installation** - Uses design specifications and understanding of local situation to install equipment or technological systems in such a way as to meet user needs. Installing equipment, machines, wiring, or programs to meet specifications. **Operation and Control** - Uses information and systems status to make necessary changes in system status applying appropriate controls. Controlling operations of equipment or systems.	Strong match to the combined O*NET skill areas. (Note: Because a one-to-one match does not exist, a crosswalk at the scale level was not developed.)

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Maintains and Troubleshoots Technology - Prevents, identifies, or solves problems in machines, computers, and other technology. Demonstrating competence includes understanding, identifying, and performing routine preventive maintenance and service on technology, detecting more serious problems, generating workable solutions to correct problems, and recognizing when additional help is needed.	**Testing** - Uses appropriate tools, techniques, and procedures to establish whether a machine or program is operating in accordance with specifications or design layouts. Conducting tests to determine whether equipment, software, or procedures are operating as expected. **Equipment Maintenance** - Evaluates the servicing needs of a machine or system conducting requisite maintenance or obtaining support for conducting this maintenance. Performing routine maintenance and determining when and what kind of maintenance is needed. **Troubleshooting** - Identifies and diagnoses the sources of operating errors in a machine, computer, or electrical system, and determines the actions to be taken to fix this error. Determining what is causing an operating error and deciding what to do about it. **Repairing** - Uses tools and procedures to repair faulty components of an operating system or machine. Repairing machines or systems using the needed tools.	Strong match to the combined O*NET skill areas. (Note: Because a one-to-one match does not exist, a crosswalk at the scale level was not developed.)

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Basic Skills	*Content*	
Reading - Locates, understands, and interprets written information in prose and documents, including manuals, graphs, and schedules; learns from text by determining the main idea or essential message; identifies relevant details, facts, and specifications; infers or locates the meaning of unknown or technical vocabulary; judges the accuracy, appropriateness, style, and plausibility of reports, proposals, and theories of other writers.	**Reading Comprehension** - Decodes, interprets, and comprehends information drawn from written documents, books, etc. Understanding written sentences and paragraphs in work-related documents.	Strong match.
Writing - Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately, composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, and flowcharts; uses language, style, organization, and format appropriate to the subject matter, purpose, and audience; includes supporting documentation, and attends to level of emphasis, form, grammar, spelling, and punctuation.	**Writing** - Communicates thoughts, ideas, information, and messages in writing; planning, generating, and revising text. Communicating effectively with others in writing as indicated by the needs of the audience.	Strong match.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Arithmetic - Performs basic computations, uses basic numerical concepts such as whole numbers and percentages in practical situations, makes reasonable estimates of arithmetic results without a calculator, and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information. **Mathematics** - Approaches practical problems by choosing appropriately from a variety of mathematical techniques, uses quantitative data to construct logical explanations for real-world situations, expresses mathematical ideas and concepts orally and in writing, and understands the role of chance in the occurrence and prediction of events.	**Mathematics** - Understands mathematical problem solving procedures and how these procedures might be used to address various problems. Using mathematics to solve problems.	Strong match.
Listening - Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose (e.g., comprehend, learn, critically evaluate, appreciate, or support a speaker).	**Active Listening** - Receives, interprets, and attends to verbal information and monitors comprehension of this material asking questions as appropriate. Listening to what other people are saying and asking questions as appropriate.	Strong match.
Speaking - Organizes ideas and communicates oral messages appropriate to listeners and situations; participates in conversation, discussion, and group presentations; selects an appropriate medium for conveying a message; uses verbal language and other cues such as body language appropriate in style, tone, and level of complexity to the audience and occasion; speaks clearly and communicates a message; understands and responds to listener feedback; and asks questions as necessary.	**Speaking** - Communicates thoughts, ideas, and information orally attending to the comprehension of listeners and the demands of the setting. Talking to others to effectively convey information.	Strong match.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Thinking Skills	*Complex Problem Solving Skills*	
Creative Thinking - Uses imagination freely, combines ideas or information in new ways, makes connections between seemingly unrelated ideas, and reshapes goals in ways that reveal new possibilities. **Decision Making** - Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses the best alternative. **Problem Solving** - Recognizes that a problem exists, identifies possible reasons for the discrepancy, devises and implements a plan of action to resolve it, evaluates and monitors progress, and revises plans as revealed by findings.	**Problem Identification** - Reflects the restructuring of an ill-defined situation such that the basic nature of the problem and requisite problem solving strategies are identified. Identifying the nature of problems. **Information Gathering** - Searches for key diagnostic information needed to address a problem using appropriate search strategies. Knowing how to find information and identifying essential information. **Information Organization** - Uses appropriate concepts and schema to organize information identifying essential features and concepts relationships. Finding ways to structure or classify multiple pieces of information. **Synthesis/Reorganization** - Reorganize and restructure applicable schema to create new ways or conceptual systems needed to understand a problem situation. Reorganizing information to get a better approach to problems or tasks. (Continued on the next page.)	SCANS Thinking Skills and O*NET Complex Problem Solving Skills are strongly linked as a group. Each framework, however, organized this group of skills in a different fashion. SCANS has divided the skills into activities, whereas O*NET has outlined a sequenced process. There are no direct matches from one SCANS activity to steps in the O*NET process. Also noted, a group comparison reveals an important dissimilarity. SCANS "Decision Making" has the implication of choosing, the actual point of deciding among alternatives. This element is missing from O*NET Complex Problem Solving Skills definitions. However, SCANS "Decision Making" does have a relationship to O*NET System Skill "Judgement and Decision Making."

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Thinking Skills	*Complex Problem Solving Skills*	
Creative Thinking (Cont.) **Decision Making** (Cont.) **Problem Solving** (Cont.)	**Idea Generation** - Uses understanding of situations and/or key features of this relevant schema to generate or identify alternative problem solutions. Generating a number of different approaches to problems. **Idea Evaluation** - Uses available expertise or mental models to identify various consequences of a proposed solution recommending changes or implementation as appropriate. Evaluating the likely success of an idea in relation to the demands of the situation. **Implementation Planning** - Creates a mental representation or formal plan for implementing a solution and identifies appropriate actions and timing of actions to implement plan. Developing approaches for implementing an idea. **Solution Appraisal** - Observes and evaluates problem solving activites using observations to adjust strategies and structure experience. Observing and evaluating the outcomes of problem solution to identify lessons learned or redirect efforts.	

361

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Thinking Skills	*Process*	
Seeing Things in the Mind's Eye - Organizes and processes symbols, pictures, graphs, objects, or other information (e.g., sees a building from a blueprint, a system's operation from schematics, and the flow of work activities from narrative descriptions).	No Equivalence.	Partial link to O*NET Visioning. The skill of visual perception of physical objects or models is unique to SCANS, yet the visualizing of activities and processes is related to O*NET System Skill "Visioning."
Knowing How to Learn - Recognizes and can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations, and is aware of learning tools such as personal learning styles (e.g., visual, aural) and formal and informal learning strategies.	**Learning Strategies** - Identifies and uses various alternatives strategies for working on learning tasks, looking for examples, taking notes, and identifying alternating strategies for working with this material. Using multiple approaches when learning or teaching new things.	Strong match. (Note: Although a relationship exists between the skill definitions, the scales developed from each definition followed different rationale. Therefore, the relationship at the scale level is not a good one.)
Reasoning - Discovers rules or principles underlying the relationship between two or more objects and applies it in solving a problem, uses logic to draw conclusions from available information, extracts rules or principles from a set of objects or written text, applies rules and principles to a new situation or determines which conclusions are correct when given a set of facts and a set of conclusions.	**Critical Thinking** - Recognizes and can analyze the strengths and weaknesses of arguments and propositions using logic to establish the validity of these propositions. Using logic and analysis to identify the strengths and weaknesses of different approaches.	Strong match.

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Personal Qualities		
Responsibility - Exerts a high level of effort and perseverance toward goal attainment; works hard to become excellent at doing tasks by setting high standards, paying attention to details, working well, and displaying a high level of concentration even when assigned an unpleasant task; displays high standards of attendance, punctuality, enthusiasm, vitality, and optimism in approaching and completing tasks.	No Equivalence.	SCANS "Personal Qualities" are not covered in the Worker Requirements framework of O*NET, which is the framework used for this cross-walk. Yet, under O*NET Worker Characteristics framework, under Work Styles, many of these attributes are defined.
Self-Esteem - Believes in own self-worth and maintains a positive view of self, demonstrates knowledge of own skills and abilities, is aware of impact on others, and knows own emotional capacity and needs and how to address them.	No Equivalence.	(See comments for SCANS "Responsibility.")
Social - Demonstrates understanding, friendliness, adaptability, empathy, and politeness in new and on-going group settings; asserts self in familiar and unfamiliar social situations; relates well to others; responds appropriately as the situation requires; and takes an interest in what others say and do.	No Equivalence.	(See comments for SCANS "Responsibility.")
Self-Management - Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and non-defensively; and is a self-starter.	No Equivalence.	(See comments for SCANS "Responsibility." Also see comments for O*NET "Monitoring.")

363

SCANS to O*NET Framework Crosswalk

SCANS	O*NET	Comments
Integrity/Honesty - Can be trusted, recognizes when faced with making a decision or exhibiting behavior that may break with commonly held personal or societal values, understands the impact of violating these beliefs and codes on an organization, self, and others, and chooses the ethical course of action.	No Equivalence.	(See comments for SCANS "Responsibility.")

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	ALLOCATES TIME	TIME MANAGEMENT
Level 5	Coordinates timing of activities across projects and/or processes. Adjusts multiple schedules for organizational effectiveness and/or profitability.	Allocating the time of scientists to multiple research projects.
Level 4	Establishes deadlines and task schedules for a project or process involving multiple tasks and work units. Evaluates and adjusts schedules as necessary.	
Level 3	Establishes deadlines and task schedules for others within own work unit for group effectiveness and/or profitability. Determines sequence and importance of work unit's tasks.	Allocating the time of subordinates to projects for the coming week.
Level 2	Determines sequence and importance of own tasks. Adjusts order and length of tasks as needed to meet deadlines and produce desired outcomes. Looks ahead in order to adjust time given to specific tasks, adjusting speed as necessary.	Keeping a monthly calendar of appointments.
Level 1	Performs own tasks in a specified order within time limits. Uses time efficiently to improve performance.	

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	ALLOCATES MONEY	MANAGEMENT OF FINANCIAL RESOURCES
Level 5	Develops and governs a financial plan for an organization, including projecting organizational revenue verses costs over time, distributing funding to departmental or project budgets, allocating revenue to financial investments for projected purposes, and evaluating financial risks of new products or business ventures.	Developing and approving yearly budgets for a large corporation and obtaining financing as necessary.
Level 4	Makes cost and revenue projections for several multiple-task projects, and develops budgets within those parameters. Evaluates and adjusts budgets as necessary based on revised cost and revenue projections.	
Level 3	Makes cost and revenue projections for a single multiple-task project, and develops a budget within those parameters. Evaluates and adjusts budget as necessary based on revised cost and revenue projections.	Preparing and managing a budget for a short-term project.
Level 2	Tracks expenditures relative to a budget; makes adjustments as necessary and/or informs superiors of potential problems. Within a specified allocation, estimates costs for specific activities. Adjusts priorities based on evaluation of costs within a specified budget.	
Level 1	Performs and records a cash transaction, including determining the amount of the transaction, receiving payment from a client/customer or obtaining funds from an account, making or receiving the correct change, and recording the transaction either by using a cash register or filing a receipt according to procedures.	Taking money from petty cash to buy office supplies and recording the amount of the expenditure.

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	ALLOCATES MATERIALS & FACILITY RESOURCES	MANAGEMENT OF MATERIAL RESOURCES
Level 5	Defines business processes or financial rules for the allocation of materials. Designs complex workstations involving multiple systems. Evaluates specifications of new equipment or materials for compatibility or integration into existing environment.	Determining the computer system needs of a large corporation and monitoring use of the equipment.
Level 4	Coordinates the acquisition and use of materials or facilities across multiple projects, assuring that proper storage and maintenance are available. Monitors the use of materials and facilities to ensure that they are being used efficiently and that project demands are being met. Distributes materials and facilities across projects.	Evaluating an annual uniform service contract for delivery drivers
Level 3	Determines the materials or facilities needed for a multiple-task project. Identifies the sources and costs of materials or facilities. Designs storage plans and distribution methods for materials, and coordinates their use within projects.	
Level 2	Determines the type and quantity of materials or facilities needed to complete a work task. Follows a distribution plan. Obtains facility resources according to a work plan. Stores and maintains per specifications.	Renting a meeting room for a management meeting.
Level 1	Obtains, stores, and/or delivers specific materials as specified in a work plan.	

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	TEACHES OTHERS	INSTRUCTING
Level 5	Acts as a mentor and works to further others' careers by promoting their professional and personal development.	
Level 4	Coaches co-workers and/or subordinates on all parts of their jobs. Helps others to apply related concepts and theories to tasks. Determines learning needs of others and recommends appropriate training programs.	Demonstrating surgical procedures to interns in a teaching hospital.
Level 3	Teaches others in multiple-task work. Assesses overall performance and offers constructive feedback.	Instructing a co-worker in how to operate a software program.
Level 2	Conveys job information to allow others to see its applicability and relevance to tasks. Assesses performance on multiple tasks and offer feedback.	
Level 1	Teaches a familiar task to inexperienced co-workers through methods such as demonstration and/or explanation. Assesses performance on a specific task and offers immediate feedback.	Instructing a new employee in the use of a time clock.

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	SERVES CLIENTS/CUSTOMERS	SERVICE ORIENTATION
Level 5	Deals with complex client needs involving a major problems or clients with difficult behaviors.	Directing relief agency operations in a disaster area. (high)
Level 4	Anticipates client/customer needs and makes recommendations for improvements.	
Level 3	Analyzes and evaluates clients'/customers' existing and future needs. Establishes productive relationships. Makes proposals in oral or written form.	
Level 2	Exceeds client/customer expectations of service. Resolves client/customer problems within corporate or organizational culture.	Making flight reservations for customers, using airline reservation system.
Level 1	Meets minimum client/customer expectations. Knows where to go for help or where to refer client/customer.	Asking customers if they would like cups of coffee.

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	NEGOTIATES TO ARRIVE AT A DECISION	NEGOTIATION
Level 5	Facilitates negotiation to reach long-term goal-achieving decisions that require consensus.	Working as an ambassador in negotiating a new treaty.
Level 4	Performs a series of negotiations with a long-term goal in mind. "Sees through others' eyes" in order to understand their perspectives.	Contracting with a wholesaler to sell items at a given cost.
Level 3	Negotiates within a group setting. Sets realistic and attainable goals. Generates potential options for compromise.	
Level 2	Negotiates with another employee or supervisor through discussion and compromise to reach a decision.	Presenting justification to a manager for altering work schedule.
Level 1	Demonstrates a willingness to accept or accommodate another's position or point of view.	

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	READING	READING COMPREHENSION
Level 5	Synthesizes specialized or highly technical documents in order to solve problems or perform analysis or evaluation.	Reading a scientific journal article describing surgical procedures.
Level 4	Simplifies and translates information from a complex document.	
Level 3	Reads work-related documents such as technical manuals, budgeting reports, blueprints, schematics, and school-related documents such as textbooks and newspapers. Comprehends and identifies trends, patterns, or themes in information.	
Level 2	Reads material such as maps, work orders, sets of instructions, and memoranda needed to complete a task.	Reading a memo from management describing new personnel policies.
Level 1	Reads simple material such as basic instructions, directories, product labels, menus, phone messages, and signs to be informed or to learn.	Reading step-by-step instructions for completing a form.

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	WRITING	WRITING
Level 5	Creates documents, articles, and/or books involving complex subject matter, synthesizing information from multiple sources. Compares contrasting information. Incorporates technical information. Creates proposals and presentations. Performs content editing on complex documents.	Writing a novel for publication.
Level 4	Writes reports on complex topics. Uses correct professional vocabulary and provides supporting documentation and notations.	
Level 3	Composes and formats basic workplace documents such as letters, memoranda, informative reports, and school-related reports such as essays. Uses vocabulary, style, and tone that are appropriate for the audience. Copyedits others' writing.	Writing a memo to staff outlining new directives.
Level 2	Records information accurately and completely. Writes standard English sentences using familiar workplace vocabulary. Communicates general meaning clearly.	
Level 1	Records or copies information using simple phrases or lists of words in order to communicate basic information pertaining to work. For example, records a personal message or fills out a simple job application or time sheet.	Taking a telephone message.

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	ARITHMETIC/MATHEMATICS	MATHEMATICS
Level 5	Uses calculus, probability, and/or statistics to solve workplace or organizational problems.	Developing a mathematical model to simulate and resolve an engineering.
Level 4	Uses algebraic and/or geometric formulas or equations to solve workplace problems. Calculates measurements of complex or irregular geometric shapes. Applies formulas to convert within or between systems of measurement. For example, converts hours to minutes or miles to kilometers.	
Level 3	Converts familiar forms of fractions, decimals, or percentages from one form to another. Calculates units of measurement and perimeters and areas of basic geometric shapes. Calculates averages, simple ratios, proportions, and rates using large numbers that may contain decimals or fractions. Uses tables, graphs, and diagrams to obtain quantitative information.	Calculating the square footage of a new home under construction.
Level 2	Uses positive and negative values. Performs multiplication and division.	
Level 1	Performs counting and simple addition and subtraction.	Counting the amount of change to be given to a customer.

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET	
	COMMUNICATION	ACTIVE	SPEAKING
Level 5	Chooses and organizes related ideas and presents them in an articulate and compelling fashion. Responds to vague or deceptive questions with diplomacy and differentiates between fictitious or emotional factors and the real facts. Detects and uses very subtle nonverbal cues. Uses vocabulary suitable to audience or communicant.	Presiding as judge in a complex legal disagreement.	Arguing a legal case before the Supreme Court.
Level 4	Convinces by means of verbal and nonverbal strategies. Presents a specific subject to an audience and responds to questions. Expresses oneself using subtleties, humor, and nonverbal signs to communicate more effectively. Responds to negative or incomplete questions appropriately.		
Level 3	Formulates questions and comments that may complement or add to the verbal information received in both interpersonal and group discussions. Interprets and responds to verbal communication, considering subtleties such as humor, tone of voice, and nonverbal signs. Enunciates correctly and uses inflection effectively.	Answering inquiries regarding credit references.	Interviewing applicants to obtain personal and work history.
Level 2	Verbalizes one's understanding of a series of instructions, expressing pertinent details and the general tone of a verbal message clearly. Makes routine oral reports according to pre-established instructions.		Greeting tourists and explaining tourist attractions.
Level 1	Follows simple sequential instructions. Asks pertinent questions for clarification. Listens and reacts tactfully to communication. Interprets simple nonverbal cues such as tone of voice and facial expressions.	Taking a customer's order.	

SCANS Scales to O*NET Scales Crosswalk

	SCANS	O*NET
	REASONING	CRITICAL THINKING
Level 5	Deconstructs opposing arguments in order to respond to them.	Writing a legal brief challenging a federal law.
Level 4	Identifies weaknesses in own argument. Anticipates opponents' arguments.	
Level 3	Uses conclusions from facts and principles to construct an argument.	
Level 2	After drawing conclusions from multiple observations, identifies a principle.	Evaluating customer complaints and determining appropriate responses.
Level 1	Draws a conclusion from a set of facts.	Determining whether a subordinate has a good excuse for being late.

O*NET to SCANS Crosswalk

Match of a single O*NET skill area to a single SCANS skill area:

O*NET	SCANS
Basic Skills	
Content	
Reading Comprehension	Reading (Basic Skills)
Active Listening	Listening (Basic Skills)
Writing	Writing (Basic Skills)
Speaking	Speaking (Basic Skills)
Process	
Critical Thinking	Reasoning (Thinking Skills)
Learning Strategies	Knowing How to Learn (Thinking Skills)
Cross-Functional Skills	
Social	
Negotiation	Negotiates to Arrive at a Decision (Interpersonal Skills)
Instructing	Teaches Others (Interpersonal Skills)
Service Orientation	Serves Clients/Customers (Interpersonal Skills)
Complex Problem Solving Skills	
Information Gathering	Acquires and Evaluates Information (Information Skills)
Information Organization	Organizes and Maintains Information (Information Skills)
Technical Skills	
Technology Design	Improves and Designs Systems (System Skills)
System Skills	
Visioning	Seeing Things in the Minds Eye (Thinking Skills)
Resource Management Skills	
Time Management	Allocates Time (Resources)
Management of Financial Resources	Allocates Money (Resources)
Management of Material Resources	Allocates Material/Facility Resources (Resources)
Management of Personal Resources	Allocates Human Resources (Resources)

BEST COPY AVAILABLE

O*NET to SCANS Crosswalk

Match of multiple O*NET skill areas to multiple SCANS skill areas:

O*NET	SCANS
Basic Skills	
Content	
Mathematics	Arithmetic (Basic Skills) Mathematics (Basic Skills)
Cross-Functional Skills	
Complex Problem Solving Skills	
Synthesis/Reorganization Idea Generation	Creative Thinking (Thinking Skills)
Technical Skills	
Operation Analysis Equipment Selection	Selects Technology (Technology Skills)
Installation Programming	Applies Technology to Task (Technology Skills)
Testing Equipment Maintenance Troubleshooting	Maintains and Troubleshoots Technology (Technology Skills)
Operation Monitoring Operation and Control	Monitors and Corrects Performance (System Skills)

BEST COPY AVAILABLE

O*NET to SCANS Crosswalk

Partial links of O*NET skill areas to SCANS skill areas:

O*NET	SCANS
Basic Skills	
Process	
Active Learning	Acquires and Evaluates Information (Information Skills)
Monitoring	Self-Management (Personal Qualities)
Cross-Functional Skills	
Social Skills	
Social Perceptiveness	Works with Cultural Diversity (Interpersonal Skills)
Coordination	Allocates Time (Resources) Allocates Human Resources (Resources)
Persuasion	Exercises Leadership (Interpersonal Skills)
Complex Problem Solving Skills	
Problem Identification	Problem Solving (Thinking Skills)
Idea Evaluation	Decision Making (Thinking Skills)
Implementation Planning	Problem Solving (Thinking Skills)
Solution Appraisal	Problem Solving (Thinking Skills)
System Skills	
System Perception	Understands Systems (System Skills)
Identification of Downstream Consequences	Understands Systems (System Skills)
Identification of Key Causes	Monitors and Corrects Performance (System Skills)
Judgement and Decision Making	Decision Making (Thinking Skills)
System Evaluation	Monitors and Corrects Performance (System Skills)

BEST COPY AVAILABLE

O*NET to SCANS Crosswalk

No match or lnks of O*NET skill areas to SCANS skill areas:

O*NET

Basic Skills
    Content
        Science
Cross-Functional Skills
    Technical Skills
        Product Inspection

No match or link of SCANS skill areas to O*NET skill areas:

SCANS

Participates as a Member of a Team (Interpersonal Skills)
Interprets and Communicates Information (Information Skills)
Uses Computers to Process Information (Information Skills)

Responsibility (Personal Qualities)
Self-Esteem (Personal Qualities)
Social (Personal Qualities)
Integrity/Honesty (Personal Qualities)

BEST COPY AVAILABLE

Appendix C

Assessments

Assessment:

Adult Basic Learning Examination, Second Edition (ABLE) 1986

Publisher:

Harcourt Brace Educational Measurement
555 Academic Court
San Antonio, TX 78204-2498
(800) 211-8378

Potential Link to SCANS Skills:

Reading
Arithmetic
Mathematics

Purpose:

The ABLE is a battery of independent, subject-specific subtests. It measures adult educational achievement in basic learning.

Description:

ABLE has three levels:

Level 1 for adults who have completed one to four years of formal education,

Level 2 for adults who have completed five to eight years of schooling, and

Level 3 for adults with at least eight years of schooling and who may or may not have graduated from high school.

Level 1 includes five tests: Vocabulary, Reading Comprehension, Spelling, Number Operations, and Problem Solving. Because this level was designed for adults with limited reading skills, most of the tests are dictated.

Levels 2 and 3 include the same tests as Level 1, along with a Language test that assesses applied grammar, capitalization, and punctuation.

SelectABLE is a locator test that helps ensure that examinees with varied educational backgrounds are placed at the appropriate ABLE testing level. It is a quick multiple-choice test, takes 15 minutes, and is hand scorable.

Population:

Adults

Format:

Multiple-choice; individual or group administration; Levels 2 and 3 may be self-administered

Untimed; each level averages 2 hours, 40 minutes (approximately 20 to 35 minutes per subtest)

SelectABLE		15 minutes
Level 3:	Number of Items	Approximate Testing Time
Vocabulary	32 items	20 minutes
Reading Comprehension	48 items	35 minutes
Spelling	30 items	20 minutes
Language	30 items	30 minutes
Number Operations	40 items	35 minutes
Problem Solving	40 items	35 minutes
Total Testing Time		2 hours, 55 minutes

Scoring:

Hand- or self-scorable

Technical Information:

Norms: grade equivalents, reference group percentile ranks, and stanines.

Norm-referenced scores are based on nationally ranked percentile and stanines used in samples from community adult education programs, prison programs, and vocational/technical high school programs.

Source of Information:

Harcourt Brace Educational Measurement 1999 Catalog, Tests and Related Products and Services, pages 75-76.

The Psychological Corporation, Harcourt Brace & Company, Human Resource Assessments Catalog 1999, page 19.

Multiple-choice format verified by telephone, 9/2/99.

Assessment:

Applicant Review (1996)

Publisher:

CHC Forecast Inc.
460 North University Avenue, Suite 201
Provo, UT 84606
(801) 373-5770

Potential Link to SCANS Skills:

Integrity/Honesty

Purpose:

"To assess the integrity of job applicants." The Applicant Review is a pre-employment screening device for applicants who are applying for "positions of trust."

Description:

The Applicant Review is an honesty test that has been in use for the past 15 years as a pre-employment screening test, primarily in the retail industry. It is primarily intended to screen out the worst applicants rather than to select the best.

The test is designed to predict the likelihood that a job applicant will be involved in employee theft or display aggressive tendencies. The items in the test describe specific job-related behaviors and attitudes associated with honesty and aggressiveness.

Population:

Members of the adult labor force who have at least a ninth-grade reading comprehension level.

Format:

102-item, multiple-choice test; untimed; the Applicant Review normally requires 20 to 25 minutes.

Group (size 1 or more); may also be taken individually by computer.

Scoring:

The Applicant Review must be scored by computer, and users can either phone the results into the Analysis Center using a toll-free number for immediate scoring (and results) or score it using their own computers. No additional costs are charged for scoring the Applicant Review as the cost is included in the cost of the instrument.

An individual Honesty score is reported for each job applicant as a percentile score. An Aggressive Tendencies score is also calculated and reported when it exceeds a designated threshold.

Technical Information:

Reliability and validity studies have been conducted and the information is available in the Technical Manual.

Source of Information:

Applicant Review Technical Manual: Summary provided by David J. Cherrington, Dept. of Organizational Leadership and Strategy, Brigham Young University.

Assessment:

Basic Achievement Skills Individual Screener (BASIS) 1983

Publisher:

Harcourt Brace Educational Measurement
555 Academic Court
San Antonio, TX 78204-2498
(800) 211-8378

Potential Link to SCANS Skills:

Reading
Writing
Mathematics

Purpose:

BASIS is an individually administered achievement test of reading, mathematics, and spelling skills.

Description:

BASIS features an Optional Writing Exercise.

All test items in reading, mathematics, and spelling are grouped in grade-referenced clusters. The clusters range from readiness through grade 8 for reading and mathematics, and from grades 1 through 8 for spelling. Average samples for the Writing Exercise are given for grades 3 through 8.

Population:

Grades 1-12 and post high school

Format:

Untimed; can be administered in one hour.

Scoring:

Hand scorable

Technical Information:

BASIS yields both criterion-referenced and norm-referenced scores.

Source of Information:

Harcourt Brace Educational Measurement 1999 Catalog, Tests and Related Products and Services, page 74.

Multiple-choice format verified by telephone, 9/2/99.

Assessment:

Basic Skills Tests (BST)

Publisher:

Psychological Services, Inc.
100 West Broadway, Suite 1100
Glendale, CA 91210
(818) 244-0033

Potential Link to SCANS Skills:

Per Psychological Services, Inc. (PSI):

Reading
Writing
Arithmetic
Mathematics
Listening
Decision Making
Problem Solving
Reasoning

Purpose:

The Basic Skills Tests are a series of 15 tests specifically designed for clerical, administrative, and customer service employee selection. The tests measure various combinations of verbal, reasoning, numerical, and perceptual skills and abilities that are important for successful job performance. The tests are published separately to allow the formation of custom test batteries.

Description:

15 BSTs include:

- Language Skills
- Reading Comprehension
- Vocabulary
- Computation
- Problem Solving
- Decision Making
- Following Oral Directions
- Following Written Directions
- Forms Checking
- Reasoning
- Classifying
- Coding
- Filing Names
- Filing Numbers
- Visual Speed & Accuracy

Population:

Applicants for clerical, administrative, and customer service jobs

Format:

Item Format: Multiple-choice

Test Length: 1.5-10 minutes per test

Test Mode: Paper-and-pencil; computer

Administration: Group or individual. No formal training required to administer tests; detailed instructions provided in Administrator's Guide.

Scoring:

Hand scoring using scoring template; optical scanning; computer administration and scoring.

Use separately or in combination with other measures; scores may be used pass/fail, banded, or in ranking examinees.

Administrator's Guide provides instructions for test administration and scoring.

Technical Information:

Norms available for seven Clerical Job Families and across clerical/administrative jobs.

Technical Manual describes test development, reliability, validity, fairness, utility, and norms.

Per PSI:

> Three criterion-related validation studies were conducted involving 62 organizations; BST scores were found to predict job performance across jobs and within job families; validity generalization analyses indicate that the tests are predictive across organizational settings (see Technical Manual).
>
> BST score reliabilities range from .63 to .83. These are lower-bound internal consistency estimates (communalities) resulting from a principal components analysis (see Technical Manual).
>
> Scores have been found to be fair to racial/ethnic minorities (African-Americans and Hispanics) and gender groups in predicting job performance.

Source of Information:

Information provided by Psychological Services, Inc.

Assessment:

Comprehensive Ability Battery (CAB)

Publisher:

Institute for Personality and Ability Testing, Inc. (IPAT)
P.O. Box 1188
Champaign, IL 61824-1188
(800) 225-IPAT

Potential Link to SCANS Skills:

Writing
Arithmetic
Mathematics
Reasoning

Purpose:

The Comprehensive Ability Battery is a group of 20 tests that measure primary abilities.

This test is designed for use by vocational and career counselors in school, business, and industrial settings. It can also be used to aid personnel administrators who hire, evaluate, and promote individuals.

Description:

With CAB, you can choose twenty different ability measures, each designed to measure a single primary ability factor. Each factor contributes a measure of ability important in industrial settings and career and vocational counseling. The tests in the battery may be used individually or in combination.

Comprehensive Ability Battery 1 measures: Verbal Ability, Numerical Ability, Spatial Ability, and Perceptual Completion.

Comprehensive Ability Battery 2 measures: Clerical Speed and Accuracy, Reasoning, Hidden Shapes, Rote Memory, and Mechanical Knowledge.

Comprehensive Ability Battery 3/4 measures: Meaningful Memory, Memory Span (requires audio cassette), Spelling, Auditory Ability (requires audio cassette), and Esthetic Judgment.

Comprehensive Ability Battery 5 measures: Organizing Ideas, Production of Ideas, Verbal Fluency, Originality, Tracking, and Drawing.

Population:

High school students and above

Format:

Most tests are multiple choice. CAB 5 contains a drawing component. Tests can be administered in groups or individually.

Testing time: approximately 5-7 minutes (per individual subtest). The 20 individual tests can be used as a whole, separately, or in various combinations to set up your own customized testing program according to needs.

Scoring:

Hand scoring only

Technical Information:

Norms: percentile norms for males, females or combined for each test at the high school level. Additional norms are available for selected tests in the battery.

Source of Information:

IPAT Behavior Assessments Catalog, 1998-1999, page 32.

Multiple-choice format verified by telephone, 9/3/99.

Assessment:

Comprehensive Adult Student Assessment System (CASAS)

Publisher:

CASAS
8910 Clairemont Mesa Blvd.
San Diego, CA 92123-1104
(619) 292-2900
(800) 255-1036

Potential Link to SCANS Skills:

Reading
Writing
Mathematics
Listening
Speaking
Problem Solving

Purpose:

CASAS includes more than 140 standardized assessment instruments, and assessment can be customized to measure specific competencies. The system can be used to place learners in programs, diagnose learners' instructional needs, monitor progress, and certify mastery of functional basic skills.

The Employability Competency System (ECS) helps programs identify the skills needed by adults and youth to succeed in today's workforce and to place them into appropriate education and employment training programs or jobs. ECS integrates assessment with a curriculum and instructional management system. ECS directly targets SCANS competencies. The assessment procedures are varied and can be adjusted to meet specific program needs. Training is required to implement.

Description:

A variety of assessment instruments measure functional reading, math, listening, speaking, and higher-order thinking skills in everyday adult life and work contexts.

All assessment is linked to competencies and instructional materials that focus on learners' goals. Results from most CASAS tests are reported as scaled scores that reflect a range of skill levels from beginning literacy to high school AAA completion. The CASAS Competency List includes 300-plus competencies that have been correlated to the SCANS competencies.

Because CASAS is a comprehensive system, training is required to ensure accurate use of tests and interpretation of learner results.

The Employability Competency System includes:

Basic Skills Assessment. Employability tests for monitoring progress in reading, math, and listening measure a learner's ability to apply basic skills in an employability context.

Certification for Employability. Certification tests are designed to determine if a learner is ready to move to a higher level of instruction or is ready to be certified as completing a program of instruction.

ECS Pre-Employment/Work Maturity Checklists. The checklists are used for performance assessment of learners' job-seeking skills and on-the-job behavior.

Critical Thinking Assessment for Employability. Collections of test items that assess a learner's critical thinking and written expression skills.

Oral Communication Applied Performance Appraisal (OCAPA). A performance-based test, administered one-on-one, that assesses speaking, listening, reading, and writing skills in functional contexts.

Population:

Adults and young adults

Format:

Formats vary by instrument; some assessments are paper-and-pencil, observational or manipulative.

Administration is either individual or group for some assessments.

Length of time to administer varies.

Training is required to administer tests.

Scoring:

Hand-scored or computer-processed and scanned by CASAS.

Technical Information:

For reliability and validity coefficients, contact publisher.

Source of Information:

CASAS Resource Catalog, 1999

CASAS web site: www.casas.org

Assessment:

Cornell Critical Thinking Test, Level X

Publisher:

Critical Thinking Books and Software
P.O. Box 448
Pacific Grove, CA 93950-0448
(831) 393-3288
(800) 458-4849

Potential Link to SCANS Skills:

- Problem Solving
- Reasoning

Purpose:

The Cornell tests are tools for general evaluation of students, curriculum and teaching experiments, program admission, employment testing, and thinking skills instruction.

Description:

Level X Sections:

- Induction
- Credibility
- Deduction
- Identification of assumptions

Population:

Grade 5–college ability

Format:

72-item, multiple-choice test

Scoring:

Machine-gradable

Technical Information:

The administration manual contains a definition of critical thinking, administration and scoring information, user norms, internal consistency, reliability, item analysis, validity, and keyed answers.

Source of Information:

Critical Thinking Books and Software Web Page: www.criticalthinking.com

---

Assessment:

Cornell Critical Thinking Test, Level Z

Publisher:

Critical Thinking Books and Software
P.O. Box 448
Pacific Grove, CA 93950-0448
(831) 393-3288
(800) 458-4849

Potential Link to SCANS Skills:

Problem Solving
Reasoning

Purpose:

The Cornell tests are tools for general evaluation of students, curriculum and teaching experiments, program admission, employment testing, and teaching critical thinking skills.

Description:

Level Z Sections:

- Deduction
- Induction
- Semantics
- Credibility
- Prediction in planning experiments
- Definition
- Identification of assumptions

Population:

Advanced-secondary adult ability

Format:

52-item, multiple-choice test

Scoring:

Machine-gradable

Technical Information:

The administration manual contains a definition of critical thinking, administration and scoring information, user norms, internal consistency, reliability, item analysis, validity, and keyed answers.

Source of Information:

Critical Thinking Books and Software Web Page: www.criticalthinking.com

Assessment:

Differential Aptitude Tests®, Fifth Edition (DAT®) 1990

Publisher:

Harcourt Brace Educational Measurement
555 Academic Court
San Antonio, TX 78204-2498
(800) 211-8378

Potential Link to SCANS Skills:

Writing
Reasoning

Purpose:

The tests measure an individual's ability to learn or to succeed in a number of different areas, such as verbal reasoning, language usage, numerical reasoning, mechanical reasoning, and space relations.

Description:

The DAT is effective with students and adults in a wide range of vocational and career planning situations, as well as for employee selection in business and industry settings.

Population:

Grades 7 through 12 and adults

Format:

Multiple choice tests; two levels: Level 1 is primarily for students in grades 7 through 9; Level 2 is primarily for students in grades 10 through 12 and adults.

A shorter version of the DAT, the DAT Partial Battery, includes two tests: Verbal Reasoning and Numerical Reasoning.

Complete Battery Working Time:	2.5 hours
Partial Battery Working Time:	1.5 hours

Subtests	Time
Verbal Reasoning	25 minutes
Numerical Reassigning	30 minutes
Abstract Reasoning	20 minutes
Perceptual Speed and Accuracy	6 minutes
Mechanical Reasoning	25 minutes
Space Relations	25 minutes
Spelling	10 minutes
Language Usage	15 minutes

Scoring:

Hand- or machine-scorable

Technical Information:

Percentile ranks, stanines, and scaled scores are presented separately for males and females, as well as combined.

Source of Information:

Harcourt Brace Educational Measurement 1999 Catalog, Tests and Related Products and Services, pages 162-166.

Multiple-choice format verified by telephone, 9/2/99.

Assessment:

Employee Aptitude Survey (EAS)

Publisher:

Psychological Services, Inc.
100 West Broadway, Suite 1100
Glendale, CA 91210
(818) 244-0033

Potential Link to SCANS Skills:

Per Psychological Services, Inc. (PSI):

Reading
Arithmetic
Mathematics
Creative Thinking
Problem Solving
Seeing Things in the Mind's Eye
Reasoning

Purpose:

The Employee Aptitude Survey consists of 10 tests specifically designed to measure cognitive, perceptual, and psychomotor abilities required for performance in a wide variety of occupations. The tests are published separately and can be selected to form custom batteries. EAS is used for pre-employment screening, job placement, training, and vocational guidance.

Description:

The 10 EAS tests include:

Verbal Comprehension
Numerical Ability
Visual Pursuit
Visual Speed and Accuracy
Space Visualization
Numerical Reasoning
Verbal Reasoning
Word Fluency
Manual Speed and Accuracy
Symbolic Reasoning

Population:

Job applicants, trainees, students, and employees; test batteries have been developed for professional/managerial/supervisory, clerical, production/mechanical/skilled and semi-skilled, and technical jobs.

Format:

Item Format:	Multiple-choice
Test Length:	5-10 minutes per test
Test Mode:	Paper-and pencil; computer
Administration:	Group or individual; no formal training required; detailed instructions provided in Examiner's Manual

Scoring:

Hand scoring using scoring template; optical scanning.

Tests can be used separately or in combination with other measures; scores may be used pass/fail, banded, or in ranking examinees.

Examiner's Manual provides guidance on test administration and scoring.

Technical Information:

Norms are available for over 85 occupational and educational groups. Supplemental Norms Report provides normative data for employees in 6 occupational groups (representing 70 job categories), plus general and educational group norms.

The Technical Manual describes test development, reliability, validity, and utility.

Per PSI:

> Criterion-related validity evidence is supported by a meta-analysis of 725 validity coefficients from 160 validation studies where EAS scores were found to predict job performance and training success. The research spans eight occupational groups, including Professional/Managerial/Supervisory, Clerical, Production/Mechanical, Technical, Sales, Unskilled, Protective Services, and Health Professionals.
>
> Construct-related evidence of validity is supported by factor analytic research and correlation studies with other instruments (see Technical Manual).
>
> EAS score reliabilities (alternate form) from .76 to .91 (EAS 1-8, 10); retest reliability for EAS 9 is estimated to be .75 (see Technical Manual).
>
> Scores have been found to be fair to racial/ethnic minorities (African Americans) and females in predicting job performance.

Source of Information:

Information provided by Psychological Services, Inc.

Assessment:

Flanagan Aptitude Classification Tests (FACT)

Publisher:

NCS
Workforce Development Group
9701 West Higgins Road
Rosemont, IL 60018-4720
(800) 237-7685

Potential Link to SCANS Skills:

Reading
Writing
Arithmetic
Seeing Things in the Mind's Eye
Reasoning

Purpose:

Provides measures of specific aptitudes related to success in a variety of industrial positions.

Note: The FACT battery differs from the Flanagan Industrial Tests (FIT) battery in that the tests are generally lower level and have longer time limits.

Description:

Used for selection, placement, reclassification, and vocational counseling, the FACT battery offers 16 separately sold tests. These tests can help assess an individual's aptitudes for lower-level industrial positions and help measure important job-related skills. The FACT battery includes assessments in the following areas:

Arithmetic - Ability to add, subtract, multiply and divide.
Assembly - Ability to visualize how separate pieces will look as a whole.
Coding - Ability to code typical office information.
Components - Ability to identify a simple figure that is part of a complete drawing.
Coordination - Ability to control hand and arm movements while working through a series of mazes.
Expression - Knowledge of correct grammar and sentence structure.
Ingenuity - Ability to think of ingenious and effective ways to solve problems.
Inspection - Ability to spot imperfections or flaws in a series of objects.
Judgment and Comprehension - Ability to read and comprehend given information.
Mechanics - Ability to understand and analyze mechanical principles and movements.
Memory - Ability to remember codes used in the Coding test.
Patterns - Ability to reproduce given pattern outlines.
Precision - Ability to do precise work and use small finger movement.
Reasoning - Ability to reason through basic mathematical work problems.
Scales - Ability to read scales, graphs, and charts.

Tables - Ability to read alpha and numerical tables.

Population:

Variety of lower-level industrial or mechanical positions

Format:

Paper and pencil, multiple-choice tests; some tests are selected response.

Time: 2–40 minutes per test

Time Limits:	
Arithmetic	10 minutes
Assembly	12 minutes
Coding	10 minutes
Components	20 minutes
Coordination	2 minutes, 40 seconds
Expression	30 minutes
Ingenuity	24 minutes
Inspection	6 minutes
Judgment and Comprehension	35 minutes
Mechanics	20 minutes
Memory	4 minutes
Patterns	20 minutes
Precision	8 minutes
Reasoning	24 minutes
Scales	16 minutes
Tables	10 minutes

Note: You can create your own custom FACT battery.

Scoring:

Hand-scored carbon format; yields 16 individual scores.

Technical Information:

Normative Data - The Examiner's Manual lists stanine scores for 29 occupations and industrial norms as well as a conversion table to convert individual test stanines to occupational stanine scores for 30 occupations.

Validation Studies - Validation studies on the FACT battery were conducted in a variety of settings and were found to be related to job performance with school grades.

Source of Information:

NCS Workforce Development Group, Business and Industry Assessments, Spring 1998 Catalog (provided by NCS), page 34.

Multiple-choice format verified by telephone, 9/3/99.

Assessment:

Flanagan Industrial Tests (FIT)

Publisher:

NCS
Workforce Development Group
9701 West Higgins Road
Rosemont, IL 60018-4720
(800) 237-7685

Potential Link to SCANS Skills:

Allocates Time
Reading
Mathematics
Arithmetic
Seeing Things in the Mind's Eye
Reasoning

Purpose:

Measures specific aptitudes related to a variety of occupations. Tests may be used separately or in any combination.

Note: The FIT battery differs from the Flanagan Aptitude Classification Tests (FACT) battery in that the tests are generally higher-level and have shorter time limits.

Description:

The FIT battery offers 18 individually sold tests that are designed to measure distinct aptitudes or functions important to a variety of industrial positions. Used for selection, placement, reassignment, and vocational counseling, the FIT battery assessments are:

Arithmetic - Ability to add, subtract, multiply and divide.
Assembly - Ability to visualize how separate pieces will look as a whole.
Components - Ability to identify a simple figure that is part of a complete drawing.
Coordination - Ability to control hand and arm movements while working through a series of mazes.
Electronics - Ability to understand electrical and electronic principles as well as analyze diagrams of electrical circuits.
Expression - Knowledge of correct grammar and sentence structure.
Ingenuity - Ability to think of ingenious and effective ways of solving problems.
Inspection - Ability to spot imperfections or flaws in a series of objects.
Judgment and Comprehension - Ability to read and comprehend given information.
Mathematics and Reasoning - Ability to reason through mathematical word problems.
Mechanics - Ability to understand mechanical principles and analyze mechanical movements.
Memory - Ability to memorize different terms and their meanings.
Patterns - Ability to perceive and reproduce pattern outlines accurately.
Planning - Ability to plan, organize and schedule various types of activities.

Precision - Capacity for precision work with small objects.
Scales - Ability to read scales, graphs, and charts.
Tables - Ability to read tables quickly and accurately.
Vocabulary - Knowledge of words used in business and government environments.

Population:

Supervisory, technical, office, skilled labor, and other industrial positions

Format:

Paper and pencil, multiple-choice tests; some tests are selected response.

Time: 5–15 minutes per test

Time Limits:

Arithmetic	5 minutes
Assembly	10 minutes
Components	10 minutes
Coordination	5 minutes
Electronics	15 minutes
Expression	5 minutes
Ingenuity	15 minutes
Inspection	5 minutes
Judgment and Comprehension	15 minutes
Mathematics and Reasoning	15 minutes
Mechanics	15 minutes
Memory	10 minutes
Patterns	5 minutes
Planning	15 minutes
Precision	5 minutes
Scales	5 minutes
Tables	5 minutes
Vocabulary	15 minutes

Scoring:

Hand-scored with scoring stencil; yields 18 individual scores.

Technical Information:

Normative Data - Percentile norms and stanines provided are based on more than 40 job classifications. Percentile norms and stanines are also listed for 12th-grade students and male university students entering their first year.

Validation Studies - Validation studies were conducted in various companies for a variety of jobs and were found to be related to job performance.

Source of Information:

NCS Workforce Development Group, Business and Industry Assessments, Spring 1998 Catalog (provided by NCS), page 40.

Multiple-choice format verified by telephone, 9/3/99.

Assessment:

Industrial Psychology International, Ltd. – Applied Math

Publisher:

Industrial Psychology International, Ltd. (IPI)
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Arithmetic
Mathematics

Purpose:

Applied Math measures the ability to solve one- and two-step algebra word problems.

The Applied Math test is used primarily in pre-employment screening. It has also been used in promotional decisions and vocational guidance.

Description:

Candidates read a short scenario containing the problem and then use appropriate math skills to select the correct response from four choices. Scores on the Applied Math test predict success in a variety of technical and clerical positions requiring abstract reasoning and numeric estimation skills.

Population:

Employable youth and adults

Format:

Multiple-choice; timed: 12 minutes; can be group administered.

Scoring:

Hand-scored with a key; the scoring stencil is used to provide a raw score of correct items. This is then converted to a stanine or percentile score for further interpretation.

Technical Information:

Reliability for the test is .83.

Validity has been established in a number of studies matching test scores to specific task performance. The studies are summarized in the manual.

Source of Information:

1998-1999 IPI Catalog, page 4, additional information provided by Industrial Psychology International, Ltd.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Blocks

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Seeing Things in the Mind's Eye

Purpose:

Blocks assesses the ability to visualize the size and spatial relationship of objects in two and three dimensions.

The Blocks test is used primarily in pre-employment screening. It has also been used in promotional decisions and vocational guidance.

Description:

Candidates view illustrations of blocks in various stacks and must count the number of blocks in the stack, including those concealed from view. This skill is important in the use of hand tools, equipment operation, warehouse management, and assembly line work.

Population:

Employable youth and adults

Format:

Test format is written response; no reading required. Timed: 6 minutes; can be group-administered.

Scoring:

Hand-scored with a key; the scoring stencil is used to provide a raw score of correct items. This is then converted to a stanine or percentile score for further interpretation.

Technical Information:

Reliability for the test is .83.

Validity - Correlation between test scores and actual job performance, as evaluated by supervisors, is high. Studies are summarized in the manual.

Source of Information:

1998-1999 IPI Catalog, page 4, additional information provided by Industrial Psychology International, Ltd.

Written-response format verified by telephone, 9/1/99

Assessment:

Industrial Psychology International, Ltd. – Fluency

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Interprets and Communicates Information
Participates as a Member of a Team
Serves Clients/Customers
Negotiates to Arrive at a Decision
Speaking
Creative Thinking

Purpose:

Fluency measures the ability to think of words rapidly and easily.

The Fluency test is used primarily in pre-employment screening. It has also been used in promotional decisions and vocational guidance.

Description:

Candidates perform three separate tasks listing words with certain characteristics, such as words beginning with "re" and ending with "ing." Candidates are given two minutes to complete each task and the results are averaged into a single score. Scores on the Fluency test predict success in jobs requiring verbal or written communication such as sales, customer service, record keeping, and clerical duties.

Population:

Employable youth and adults

Format:

Test format is written response. Timed: 6 minutes; can be group-administered.

Scoring:

Hand-scored; raw score is obtained by adding the number of correct responses. This is then converted to a stanine or percentile score.

Technical Information:

Reliability for the test is .70.

Validity has been established in a number of studies matching test scores to job performance. The studies are summarized in the technical manual.

Source of Information:

1998-1999 IPI Catalog, page 6, additional information provided by Industrial Psychology International, Ltd.

Written-response format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Judgment

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Allocates Time, Allocates Money, Allocates Material and Facility Resources, Allocates Human Resources, Acquires and Evaluates Information, Organizes and Maintains Information, Interprets and Communicates Information, Uses Computers to Process Information, Teaches Others, Exercises Leadership, Negotiates to Arrive at a Decision, Understands Systems, Monitors and Corrects Performance, Improves and Designs Systems, Selects Technology, Applies Technology to Task, Creative Thinking, Problem Solving, Seeing Things in the Mind's Eye, Reasoning

Purpose:

Judgment measures the ability to think logically and deduce solutions to abstract problems.

The Judgment test is used primarily in pre-employment screening. It has also been used in promotional decisions and vocational guidance.

Description:

Candidates select the next logical item in a series of numbers or letters or choose the group of letters that does not logically belong with the others. This problem-solving skill is important in a broad spectrum of jobs requiring abstract reasoning and organizational skill.

Population:

Employable youth and adults

Format:

Multiple-choice test; timed: 6 minutes; can be group-administered.

Scoring:

Hand-scored with a key; the scoring stencil is used to provide a raw score of correct items. This is then converted to a stanine or percentile score for further interpretation.

Technical Information:

Reliability for the Judgment test is .89.

Validity has been established in a number of studies matching test scores to job performance. The studies are summarized in the technical manual.

Source of Information:

1998-1999 IPI Catalog, page 6, additional information provided by Industrial Psychology International, Ltd.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Numerical Proficiency Assessment (NPA)

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Understands Systems, Monitors and Corrects Performance, Improves and Designs Systems, Selects Technology, Applies Technology to Task, Maintains and Troubleshoots Technology, Mathematics

Purpose:

The Numerical Proficiency Assessment is a computer-adaptive test that measures the ability to evaluate and understand advanced mathematical concepts.

The NPA is used primarily in pre-employment screening and promotion to management. It has also been used in vocational guidance and job counseling.

Description:

The computer program randomly selects an item of average difficulty to begin the assessment. The difficulty of the subsequent items is then automatically adjusted to match the candidate's proficiency level. Performance on the NPA indicates the candidate's ability to apply reason and logic to a variety of situations and to process complex information.

Candidates view up to 16 graphs, tables, and algebra word problems during the 20-minute test.

Population:

Employable youth and adults

Format:

Computer-adaptive test, designed as multiple choice. Timed: 20 minutes.

Scoring:

Computer administration and scoring allow immediate review of results. A computer report provides immediate results in the form of a stanine score.

Technical Information:

Reliability for the NPA is approximately .81.

Source of Information:

1998-1999 IPI Catalog, page 2, additional information provided by Industrial Psychology International, Ltd.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Numbers

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Arithmetic

Purpose:

Numbers measures the ability to perform numerical computations and to understand mathematical concepts.

The Numbers test is used primarily in pre-employment screening. It has also been used in promotional decisions and vocational guidance.

Description:

Candidates must solve one- and two-step math problems using appropriate combinations of addition, subtraction, multiplication, and division. Basic math skills are important in a wide variety of positions that require record keeping, sales, accounting, work planning, or obtaining measurements.

Population:

Employable youth and adults

Format:

Multiple-choice test; timed: 6 minutes; can be group-administered.

Scoring:

Hand-scored with a key; the scoring stencil is used to provide a raw score of keyed items. This is then converted to a stanine or percentile score for further interpretation.

Technical Information:

Reliability for the test is .85.

Validity has been established in a number of studies matching test scores to job performance. The studies are summarized in the manual.

Source of Information:

1998-1999 IPI Catalog, page 8, additional information provided by Industrial Psychology International, Ltd.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Parts

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Allocates Time, Allocates Money, Allocates Material and Facility Resources, Allocates Human Resources, Acquires and Evaluates Information, Organizes and Maintains Information, Interprets and Communicates Information, Uses Computers to Process Information, Exercises Leadership, Negotiates to Arrive at a Decision, Understands Systems, Monitors and Corrects Performance, Improves and Designs Systems, Selects Technology, Applies Technology to Task, Creative Thinking

Purpose:

Parts measures the ability to organize a series of parts in relation to the whole object.

The Parts test is used primarily in pre-employment screening. It has also been used in promotional decisions and vocational guidance.

Description:

Candidates view illustrations of geometric shapes that have been disassembled and must select the completed shape from four choices presented. This skill is essential to planning, scheduling, and meeting work demands, as well as to technical jobs involving design, engineering, or drafting.

Population:

Employable youth and adults

Format:

Multiple-choice (selected-response) test; timed: 6 minutes; can be group-administered.

Scoring:

Hand-scored with a key; the scoring stencil is used to provide a raw score of correct items. This is then converted to a stanine or percentile score for further interpretation.

Technical Information:

Reliability for the test is .88.

Validity has been established in a number of studies matching test scores to job performance. The studies are summarized in the technical manual.

Source of Information:

1998-1999 IPI Catalog, page 9, additional information provided by Industrial Psychology International, Ltd.

Multiple-choice (selected-response) format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Reading Comprehension

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Reading

Purpose:

Assesses literacy from functional (symbol recognition) to advanced (early college level) with items that relate to common workplace tasks.

Description:

One series of questions asks the candidate to locate information found in a typical office product catalog. As the test progresses, comprehension of more complex text is required.

Population:

Employable youth and adults

Format:

Multiple-choice test; timed: 12 minutes.

Scoring:

Hand-scored with a key; candidates use a reusable test booklet and respond on a pull-apart answer sheet that transfers the answers to a scoring key.

Technical Information:

For reliability and validity information, contact publisher.

Source of Information:

1998-1999 IPI Catalog, page 10.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Verbal Proficiency Assessment (VPA)

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Allocates Human Resources, Interprets and Communicates Information, Participates as a Member of a Team, Teaches Others, Serves Clients/Customers, Exercises Leadership, Negotiates to Arrive at a Decision, Understands Systems, Speaking

Purpose:

The Verbal Proficiency Assessment is a computer-adaptive test that uses a series of vocabulary items to measure high-level verbal skills and logical thinking.

The VPA is used primarily in pre-employment screening and promotion to management. It has also been used in job counseling and vocational guidance.

Description:

The computer program randomly selects an item of average difficulty to begin the assessment. The difficulty of the subsequent items is then automatically adjusted to match the candidate's proficiency level. Scores predict success in a variety of jobs that involve abstract reasoning and strong communication skills.

Candidates have up to 20 minutes to answer a maximum of 20 items ranging from sentence completion to word analogies.

Population:

Employable youth and adults

Format:

Computer-adaptive test; designed as multiple choice. Timed: 20 minutes.

Scoring:

Computer administration and scoring allow immediate review of a computer report providing results in the form of a stanine score.

Technical Information:

Reliability for the VPA is approximately .83.

Source of Information:

1998-1999 IPI Catalog, page 2, additional information provided by Industrial Psychology International, Ltd.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

Industrial Psychology International, Ltd. – Workplace Skills Survey

Publisher:

Industrial Psychology International, Ltd.
4106 Fieldstone Road
Champaign, IL 61822
(217) 398-1437
(800) 747-1119

Potential Link to SCANS Skills:

Per IPI: Acquires and Evaluates Information, Organizes and Maintains Information, Interprets and Communicates Information, Uses Computers to Process Information, Participates as a Member of a Team, Teaches Others, Serves Clients/Customers, Exercises Leadership, Negotiates to Arrive at a Decision, Applies Technology to Task, Writing, Speaking, Decision Making, Problem Solving, Reasoning, Responsibility, Self-Esteem, Social, Self-Management, Integrity/Honesty

Purpose:

The Workplace Skills Survey provides critical information regarding basic work ethics and employment skills for pre-employment and promotional decisions. It also provides useful information for training and adult education programs.

Description:

Candidates must select the correct response to questions about common business information and workplace situations. Many of the test items are scenarios that describe realistic workplace situations, problems, or issues. The test items measure skills such as the appropriate use of company time and resources, telephone etiquette, and the proper way to resolve on-the-job conflicts. Test results address six individual scales:

Communication
Adapting to Change
Problem Solving
Work Ethics
Technological Literacy
Teamwork

Population:

Employable youth and adults

Format:

Multiple-choice test; timed: 20 minutes.

Scoring:

Candidates respond on a pull-apart answer sheet that automatically transfers their answers to a scoring key.

Scores are provided for the six individual scales, and an overall composite score for each test taker.

Technical Information:

Reliability for the test is .90.

Source of Information:

1998-1999 IPI Catalog, page 3, additional information provided by Industrial Psychology International, Ltd.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

PDI Employment Inventory

Publisher:

Personnel Decisions, Inc.
International Corporate Offices
2000 Plaza VII Tower
45 South Seventh Street
Minneapolis, MN 55402-1608
(612) 339-0927
(800) 633-4410

Potential Link to SCANS Skills:

Integrity/Honesty

Purpose:

The PDI Employment Inventory is a pre-employment tool to help select applicants who will become productive and successful employees.

Description:

The PDI Employment Inventory is comprised of four pre-employment scales that have been validated for a broad range of jobs in a wide range of industries. Scales can be used individually or in various combinations. They are:

PDI Performance Scale: Predicts success in entry-level, non-exempt positions in which employees need to be reliable, dependable, motivated, and rule-following.

PDI Tenure Scale: Predicts the likelihood that an individual will stay on the job for at least three months. Measures an applicant's commitment, impulsiveness, responsibility, and motivation.

PDI Customer Service Scale: Predicts success in positions with high people/customer contact, in which it is necessary to be friendly, courteous, and service-oriented.

PDI Sales Scale: Predicts success in jobs that involve selling, in which employees must have high levels of initiative, commitment, persuasiveness, and persistence.

Population:

Employable youth and adults

Format:

Multiple-choice; 15-20 minutes to complete.

Scoring:

Three scoring options:

PDI DiskScore - Software is available for scoring the PDI Employment Inventories on-site using a PC. EI responses are entered into the computer and the results are automatically generated.

PDI FaxScore - Automated fax system enables the faxing of completed customized answer sheets to PDI with a score report faxed back within 2 hours.

PDI PhoneScore - Call the PDI Test Processing Center and read the responses from a completed PDI Employment Inventory over the phone. A Test Processor enters the data and immediately provides score results.

Technical Information:

Technical information is available from publisher.

Source of Information:

Information provided by Personnel Decisions, Inc.

Assessment:

Professional Employment Test (PET)

Publisher:

Psychological Services, Inc.
100 West Broadway
Suite 1100
Glendale, CA 91210
(818) 244-0033

Potential Link to SCANS Skills:

Per Psychological Services, Inc. (PSI):

Reading
Arithmetic
Mathematics
Problem Solving
Reasoning

Purpose:

The Professional Employment Test measures critical thinking and data interpretation abilities which are vital in managerial and professional occupations. Test items are based on language and situations that are commonly encountered in business and government work settings.

Description:

4 PET item types include:

- Quantitative Problem Solving
- Reading Comprehension
- Reasoning
- Data Interpretation

Population:

Applicants for entry-level, professional, managerial, and supervisory jobs

Format:

Item Format: Multiple-choice

Test Length: long form - 80 minutes; short form - 40 minutes

Test Mode: Paper-and-pencil

Administration: Group or individual; no formal training required; detailed instructions provided in the Administration Instructions.

Scoring:

Hand scoring using scoring template; optical scanning.

Use separately or in combination with other measures; scores may be used pass/fail, banded, or in ranking examinees.

Administration Instructions provide guidance for test administration and scoring.

Technical Information:

The Technical Manual describes test development, reliability, validity, fairness, utility, and norms.

Per PSI:

> Criterion-related validation studies were conducted for three major occupational groups indicating that PET scores are predictive of job performance in each case.
>
> Scores have been found to be fair to racial/ethnic minorities (African-Americans) in predicting job performance (analyses by age and gender were not technically feasible).
>
> PET score reliability (KR20) is .86.
>
> Norms are available for three major job families and across professional occupations.

Source of Information:

Information provided by Psychological Services, Inc.

Assessment:

SRA® Reading-Arithmetic Index (RAI™)

Publisher:

NCS
Workforce Development Group
9701 W. Higgins Road
Rosemont, IL 60018-4720
(800) 237-7685

Potential Link to SCANS Skills:

Reading
Arithmetic

Purpose:

Assesses an individual's level of development in reading and/or math computation.

Description:

The Reading Index (RI) contains 60 items that test applicants' ability to read and understand basic materials through grade level nine.

The Arithmetic Index (AI) contains 54 items that test ability to add, subtract, multiply, divide and use fractions, decimals and percentages through grade level eight.

Population:

Employable youth and adults

Format:

Multiple-choice (selected-response); paper-and-pencil or computer. Separate booklets for reading and arithmetic tests. Reading Index contains 60 items; Arithmetic Index contains 54 items.

No time limit (approximately 25 minutes each).

Scoring:

Hand-scored carbon format or computer; grade-level, proficiency and normative scores are provided.

Technical Information:

Validation studies have been conducted. Contact publisher for more information.

Source of Information:

Business and Industry Assessments, Spring 1998 Catalog, NCS Workforce Development Group, page 64.

Multiple-choice format verified by telephone, 9/3/99.

Assessment:

TABE (Test of Adult Basic Education) 7&8 Complete Battery

Publisher:

CTB/McGraw-Hill
20 Ryan Ranch Road
Monterey, CA 93940-5703
(831) 393-7282
(800) 538-9547

Potential Link to SCANS Skills:

Per CTB/McGraw-Hill:

Reading Test addresses SCANS Reading, Reasoning, Acquires and Evaluates Information

Mathematics Computation Test addresses SCANS Arithmetic, Reasoning, Acquires and Evaluates Information

Applied Mathematics Test addresses SCANS Mathematics, Creative Thinking, Problem Solving, Reasoning, Acquires and Evaluates Information

Language Test addresses SCANS Writing, Reasoning, Acquires and Evaluates Information

Spelling Test addresses SCANS Writing (measured indirectly), Reasoning, Acquires and Evaluates Information

Purpose:

A comprehensive assessment of basic reading, mathematics, language, and spelling skills.

Description:

TABE 7&8 includes subtests in Reading, Mathematics Computation, Applied Mathematics, Language, and Spelling.

Reading - Measures basic reading skills and the ability to construct meaning from a variety of life-skills and prose selections. Vocabulary is measured as part of the reading process.

Mathematics Computation - Measures the core computation skills necessary for any successful mathematics program: addition, subtraction, multiplication, and division of whole numbers, decimals, and fractions. Also included are integers, algebraic expressions, exponents, and percents.

Applied Mathematics - Measures general mathematical literacy. The test covers numeration, computation in context, estimation, number theory, measurement, data interpretation, geometry, pre-algebra, and algebra.

Language - Measures skills in the areas of usage, mechanics, sentence formation, and paragraph development. The focus is on general writing competence and the skills that support the writing process.

Spelling - Measures the spelling skills needed for effective written communication. Content covers vowel sounds, consonant sounds, and structural units.

Population:

Employable youth and adults

Format:

All items are selected-response (multiple-choice). Two versions of each test are available: a Complete Battery (approximately 3 hours) and a Survey (approximately 1.5 hours). Two parallel, equivalent forms, 7 and 8, are available.

There are five levels available in TABE 7&8. The levels and related target grade ranges of difficulty are:

Test Level	Grade Range
L (Literacy)	0-1.9
E (Easy)	1.6-3.9
M (Medium)	3.6-6.9
D (Difficult)	6.6-8.9
A (Advanced)	8.6-12.9

A Locator Test, which is a quick screening test, helps to select the correct TABE level to administer.

Number of Items and Time Requirements:

Locator Test	# Items, Est. Testing Time
Reading	17 items, 18 minutes
Mathematics	18 items, 16 minutes
Language	15 items, 15 minutes

TABE 7&8 Complete Battery (Levels E, M, D, and A)
Allow 10 minutes, to times below, for instruction, putting names on answer sheets, etc.
NOTE: Spelling Test is optional and does not contribute to the Complete Battery total scores.

Reading:	50 items, 50 minutes
Mathematical Computation:	25 items, 15 minutes
Applied Mathematics:	50 items, 50 minutes
Language:	55 items, 39 minutes
Spelling:	20 items, 10 minutes
TOTAL:	200 items, 2 hours, 44 minutes

Scoring:

The majority of TABE scoring is done locally by TABE users.

Examinees who take the online version of TABE 7&8 using TABE-PC receive their test results immediately after the administration is complete. Results are displayed on screen and in the form of printed reports.

Answer sheets are also available for examiners who score their tests by hand. Norms books provide look-up tables to help translate number-correct scores to scale scores, percentile ranks, stanines, and grade equivalents.

Technical Information:

The validity and reliability of the TABE 7&8 Complete Battery and Survey are documented in the TABE 7&8 Technical Report.

Source of Information:

Response from CTB/McGraw-Hill.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

TABE (Test of Adult Basic Education) 7&8 Survey

Publisher:

CTB/McGraw-Hill
20 Ryan Ranch Road
Monterey, CA 93940-5703
(831) 393-7282
(800) 538-9547

Potential Link to SCANS Skills:

Per CTB/McGraw-Hill:

Reading Test addresses SCANS Reading, Reasoning, Acquires and Evaluates Information

Mathematics Computation addresses SCANS Arithmetic, Reasoning, Acquires and Evaluates Information

Applied Mathematics addresses SCANS Mathematics, Creative Thinking, Problem Solving, Reasoning, Acquires and Evaluates Information

Language Test addresses SCANS Writing, Reasoning, Acquires and Evaluates Information

Spelling Test addresses SCANS Writing (measured indirectly), Reasoning, Acquires and Evaluates Information

Purpose:

A shortened version of the tests in the TABE 7&8 Complete Battery. The TABE 7&8 Survey includes fewer items and offers a shorter testing time.

Description:

TABE 7&8 includes subtests in Reading, Mathematics Computation, Applied Mathematics, Language, and Spelling.

Reading - Measures basic reading skills and the ability to construct meaning from a variety of life-skills and prose selections. Vocabulary is measured as part of the reading process.

Mathematics Computation - Measures the core computation skills necessary for any successful mathematics program: addition, subtraction, multiplication, and division of whole numbers, decimals, and fractions. Also included are integers, algebraic expressions, exponents, and percents.

Applied Mathematics - Measures general mathematical literacy. The test covers numeration, computation in context, estimation, number theory, measurement, data interpretation, geometry, pre-algebra, and algebra.

Language - Measures skills in the areas of usage, mechanics, sentence formation, and paragraph development. The focus is on general writing competence and the skills that support the writing process.

Spelling - Measures the spelling skills needed for effective written communication. Content covers vowel sounds, consonant sounds, and structural units.

Population:

Employable youth and adults

Format:

All items are selected-response (multiple-choice). Two versions of each test are available: a Complete Battery (approximately 3 hours) and a Survey (approximately 1.5 hours). Two parallel, equivalent forms, 7 and 8, are available.

There are five levels available in TABE 7&8. The levels and related target grade ranges of difficulty are:

Test Level	Grade Range
L (Literacy)	0-1.9
E (Easy)	1.6-3.9
M (Medium)	3.6-6.9
D (Difficult)	6.6-8.9
A (Advanced)	8.6-12.9

A Locator Test, which is a quick screening test, helps to select the correct TABE level to administer.

Number of Items and Time Requirements:

Locator Test	# Items, Est. Testing Time
Reading	17 items, 18 minutes
Mathematics	18 items, 16 minutes
Language	15 items, 15 minutes

TABE 7&8 Survey (Levels E, M, D, and A)
Allow 10 minutes, to below times, for instruction, putting names on answer sheets, etc.
NOTE: Spelling Test is optional and does not contribute to the total scores.

Reading:	25 items, 25 minutes
Mathematical Computation:	15 items, 9 minutes
Applied Mathematics:	25 items, 25 minutes
Language:	25 items, 18 minutes
Spelling:	20 items, 10 minutes
TOTAL:	110 items, 1 hour, 27 minutes

Scoring:

The majority of TABE scoring is done locally by TABE users.

Examinees who take the online version of TABE 7&8 using TABE-PC receive their test results immediately after the administration is complete. Results are displayed on screen and in the form of printed reports.

Answer sheets are also available for examiners who score their tests by hand. Norms books provide look-up tables to help translate number-correct scores to scale scores, percentile ranks, stanines, and grade equivalents.

Technical Information:

The validity and reliability of the TABE 7&8 Complete Battery and Survey are documented in the TABE 7&8 Technical Report.

Source of Information:

Response from CTB/McGraw-Hill.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

TABE Work-Related Foundation Skills (TABE-WF)

Publisher:

CTB/McGraw-Hill
20 Ryan Ranch Road
Monterey, CA 93940-5703
(831) 393-7282
(800) 538-9547

Potential Link to SCANS Skills:

Per CTB/McGraw-Hill:

Reading Test addresses SCANS Reading, Reasoning, Acquires and Evaluates Information

Mathematics Computation Test addresses SCANS Arithmetic, Reasoning, Acquires and Evaluates Information

Applied Mathematics Test addresses SCANS Mathematics, Creative Thinking, Problem Solving, Reasoning, Acquires and Evaluates Information

Language Test addresses SCANS Writing, Reasoning, Acquires and Evaluates Information

Purpose:

TABE Work-Related Foundation Skills, Forms 7&8, is a series of tests designed to measure achievement of foundation skills in reading, mathematics, and language. Using appropriate content and language to represent workplace contexts, TABE Work-Related Foundation Skills assesses skills that an individual needs in order to function in the workplace and in society.

Description:

TABE Work-Related Foundation Skills has four forms:

Health
Trade/Technical
Business/Office
General

All four forms measure comparable skills. Three of the forms (Health, Trade/Technical, and Business/Office) are set in specific job-related contexts, each emphasizing skills appropriate to its particular occupational cluster. The General form uses a blend of the various occupational settings for its context and can therefore be considered an alternate to each of the other forms.

Each of the TABE Work-Related Foundation Skills tests may be considered an alternate form of TABE 7&8, Complete Battery or Survey, Level D.

Each form of TABE Work-Related Foundation Skills contains the following subtests:

- Reading
- Mathematics Computation
- Applied Mathematics
- Language

Population:

Employable youth and adults

Format:

All items are selected response (multiple choice). Total testing time for each form is about 2 hours.

Number of Items and Time Requirements:

Reading:	40 items, 40 minutes
Mathematics Computation:	20 items, 15 minutes
Applied Mathematics:	35 items, 35 minutes
Language:	35 items, 35 minutes
TOTAL:	130 items, 2 hours, 5 minutes

Scoring:

The majority of TABE scoring is done locally by TABE users.

Examinees who take the online version of TABE Work-Related Foundation Skills using TABE-PC receive their test results immediately after the administration is complete. Results are displayed on screen and in the form of printed reports.

Answer sheets are also available for examiners who score their tests by hand. Norms Books provide look-up tables to help translate number-correct scores to scale scores, percentile ranks, stanines, and grade equivalents.

Technical Information:

The validity and reliability of the TABE Work-Related Foundation Skills are documented in the TABE Work-Related Foundation Skills Technical Report.

Source of Information:

Response from CTB/McGraw-Hill.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

TABE Work-Related Problem Solving (TABE-PS)

Publisher:

CTB/McGraw-Hill
20 Ryan Ranch Road
Monterey, CA 93940-5703
(831) 393-7282
(800) 538-9547

Potential Link to SCANS Skills:

Per CTB/McGraw-Hill:

Allocates Time, Allocates Money, Allocates Material and Facility Resources, Allocates Human Resources, Acquires and Evaluates Information, Organizes and Maintains Information, Interprets and Communicates Information, Understands Systems, Monitors and Corrects Performance, Improves and Designs Systems, Selects Technology, Applies Technology to Task, Reading, Writing, Arithmetic (measured indirectly), Creative Thinking, Decision Making, Problem Solving, Seeing Things in the Mind's Eye, Reasoning

Purpose:

TABE Work-Related Problem Solving is an authentic performance assessment that measures a wide range of problem solving competencies in a variety of work-related contexts. It is designed to help employers, educators, and training professionals diagnose how examinees deal with different aspects of problem solving.

Description:

TABE Work-Related Problem Solving is part of the TABE 7&8 series of assessments. This test is designed to be a stand-alone test and has a separate scale. It may be used in conjunction with TABE 5&6, TABE 7&8 Complete Battery or Survey, or with TABE Work-Related Foundation Skills tests.

TABE Work-Related Problem Solving is designed to measure broad competencies, which encompass a wide range of skills. The tests are constructed-response tests. The examinee is expected to construct his or her own response to questions or tasks presented in the context of problem situations.

Population:

High school and post-secondary educational programs, as well as business and industry

Format:

Constructed-response test (the examinee is expected to construct his or her own responses to the presented situations).

Number of Tasks and Time Requirements:

Practice Exercise:	1 task, 10 minutes
Form 7:	4 tasks, one hour
Form 8:	5 tasks, one hour

Scoring:

The majority of TABE scoring is done locally by TABE users. Scoring services may also be arranged through CTB/McGraw-Hill's Scoring Department, which employs highly trained professional scorers to provide efficient, reliable, and accurate results.

Scoring TABE Work-Related Problem Solving requires raters to score the examinees' responses to the stimuli according to carefully developed scoring rubrics. The TABE Work-Related Problem Solving Examiner's Manual/Scoring Guide gives clear, concise guidance in scoring. It includes the actual test pages, complete with answers and the appropriate scoring rubric.

The test yields a total test score and a mastery score for each of the four competencies assessed. Total test scores are available as scale scores, percentiles and stanines. Competency mastery scores are in the form of number-correct scores. The total score allows examiners to compare a student's performance on the problem-solving trait with that of an appropriate norm group. The competency scores allow examiners to determine which of the four underlying problem-solving competencies the student has mastered and which need additional work.

Technical Information:

The validity and reliability of TABE Work-Related Problem Solving are documented in the TABE Work-Related Problem Solving Technical Report.

Source of Information:

Response from CTB/McGraw-Hill.

Assessment:

Watson-Glaser Critical Thinking Appraisal®, Forms A and B (WGCTA), 1980

Publisher:

The Psychological Corporation
555 Academic Court
San Antonio, TX 78204
(800) 211-8378

Potential Link to SCANS Skills:

Acquires and Evaluates Information
Problem Solving
Reasoning

Purpose:

The Watson-Glaser Critical Thinking Appraisal measures five aspects of the ability to think critically: drawing sound inferences, recognizing assumptions, reasoning by deduction, drawing conclusions, and evaluating arguments.

Description:

Exercises include problems, statements, arguments, and interpretations of material similar to those encountered daily at work, in the classroom, and in newspaper and magazine articles.

Population:

Grades 9 through 12, college students, preprofessionals and professionals

Format:

Multiple-choice test; two equivalent forms, A and B are available. Working time is approximately 40-50 minutes; individual or group administration.

Scoring:

Hand scorable

Technical Information:

Norms: Percentiles corresponding to Total Score for a variety of groups.

Source of Information:

Harcourt Brace Educational Measurement 1999 Catalog, Tests and Related Products and Services, page 94.

Multiple-choice format verified by telephone, 9/1/99.

Assessment:

Wonderlic Basic Skills Test (WBST®)

Publisher:

Wonderlic, Inc.
1795 N. Butterfield Road
Libertyville, IL 60048-1238
(800) 963-7542

Potential Link to SCANS Skills:

Reading
Arithmetic
Mathematics

Purpose:

The Wonderlic Basic Skills Test measures fundamental, job-related quantitative and verbal skills.

Description:

Quantitative skills are measured in terms of practical mathematical applications; verbal ability is measured in terms of reading comprehension, word knowledge, grammar, and sentence construction.

Population:

Employable youth and adults

Format:

Two multiple-choice tests – mathematics and verbal skills; timed: 20 minutes each; administered with paper and pencil and scored using a PC. Composite version takes 45 minutes to complete.

Scoring:

The test is scored and a WBST Individual Score Report is printed using the scoring diskette provided in the WBST package. Scoring takes a couple of minutes.

Technical Information:

Contact the publisher.

Source of Information:

Wonderlic, Inc. web page: www.wonderlic.com.

Multiple-choice format verified by telephone, 9/10/99.

Assessment:

Work Keys® Applied Mathematics

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

Arithmetic
Mathematics

Purpose:

The Applied Mathematics assessment measures the examinee's skill in applying mathematical reasoning to work-related problems. The test questions require the examinee to set up and solve the types of problems and do the types of calculations that actually occur in the workplace.

Description:

This assessment contains questions at five levels of complexity, with Level 3 being the least complex and Level 7 being the most complex. The levels build on each other, each incorporating the skills assessed at the preceding levels.

Population:

Employable youth and adults

Format:

Paper-pencil, 45 minutes to solve 33 multiple-choice problems. Designed to be taken with a calculator. A formula sheet that includes all formulas required for the assessment is provided.

Scoring:

Scannable answer sheets

Technical Information:

Reliability is .86. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 1; Booklet, "Work Keys Reliability and Validity."

Assessment:

Work Keys® Applied Technology

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

Problem Solving
Reasoning

Purpose:

The Applied Technology assessment measures the examinee's skill in solving problems of a technological nature. The content covers the basic principles of mechanics, electricity, fluid dynamics, and thermodynamics as they apply to machines and equipment in the workplace. The emphasis is on identifying relevant aspects of problems, analyzing and ordering those aspects, and applying existing materials or methods to new situations.

Description:

This assessment contains questions at four levels of complexity, with Level 3 being the least complex and Level 6 being the most complex. Although Level 3 is the least complex, it still assesses a level of applied technology skill well above no skill at all. The levels build on each other, each incorporating the skills assessed at the preceding levels.

Population:

Employable youth and adults

Format:

Paper-pencil, 45 minutes to answer 32 multiple-choice questions.

Scoring:

Scannable answer sheets

Technical Information:

Reliability is .80. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 8; Booklet, "Work Keys Reliability and Validity."

Assessment:

Work Keys® Listening & Writing: Listening

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

Listening
Writing

Purpose:

The Listening portion of the Listening and Writing assessment measures the examinee's skill in listening to and understanding work-related messages.

Description:

The assessment is administered via an audiotape which contains all directions and messages. Examinees are asked to listen to the audiotaped messages and then write messages or summaries based the information they have heard. The examinee is placed in the role of an employee who receives information from customers, co-workers, or suppliers, and must then write down the information to communicate it to someone else.

Population:

Employable youth and adults

Format:

Audiotape, 40 minutes to complete 6 responses.

Scoring:

Sent to ACT for scoring.

Scoring is based on the accuracy and completeness of the information in the examinee's written responses. It is not based on mechanics or writing style. Two or more raters read each message and assign it a score. Overall scores are then calculated to indicate the particular level of skill for each examinee. Skill levels range from 1 to 5.

Technical Information:

Reliability is .85. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 14; Booklet, "Work Keys Reliability and Validity."

Assessment:

Work Keys® Locating Information

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

- Reading
- Decision Making
- Reasoning

Purpose:

The Locating Information assessment measures the examinee's skill in using information presented in workplace graphics such as diagrams, floor plans, tables, forms, graphs, charts, and instrument gauges. Examinees are asked to locate, insert, compare, and summarize information in one graphic or in a group of related graphics.

Description:

The assessment contains graphics and questions at four levels of complexity, with Level 3 being the least complex and Level 6 being the most complex. The levels build on each other, each incorporating the skills assessed at the preceding levels.

Population:

Employable youth and adults

Format:

Paper-pencil, 45 minutes to answer 38 multiple-choice questions.

Scoring:

Scannable answer sheets

Technical Information:

Reliability is .77. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 19; Booklet, "Work Keys Reliability and Validity."

Assessment:

Work Keys® Observation

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

Interprets and Communicates Information
Listening

Purpose:

The Observation assessment measures the examinee's skill in paying attention to instructions and demonstrations, and in noticing details.

Description:

The scenarios and questions are based on the actual demands of the workplace, and the selections take the form of video presentations of individuals in various workplace settings. When presented with increasingly complex situations, examinees are asked to pay careful attention to steps to be followed in a process, to safety procedures, and to quality-control standards. Factors influencing the complexity of an observation task include how many variables the task involves, how strongly the examinee is directed to pay attention to certain details, and how many distractors (e.g., extraneous details) are present and how strong these distractors are.

The assessment contains multiple-choice questions at four levels of complexity, with Level 3 being the least complex and Level 6 the most complex. Although Level 3 is the least complex, it still assesses a level of observation skill well above no skill at all. The levels build on each other, each incorporating the skills assessed at the preceding levels.

Population:

Employable youth and adults

Format:

Administered via videotape. Each level is represented by three scenarios, each of which is followed by three items, for a total of 36 items. Total testing time, which is split into two sessions, is approximately one hour: session one lasts approximately 25 minutes, and session two lasts approximately 35 minutes.

Scoring:

Scannable answer sheets

Technical Information:

Reliability is .72. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 26; Booklet, "Work Keys Reliability and Validity."

Assessment:

Work Keys® Reading for Information

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

Reading

Purpose:

The Reading for Information assessment measures an examinee's skill in reading and understanding work-related instructions and policies.

Description:

The reading passages and questions in the assessment are based on the actual demands of the workplace. Passages take the form of memos, bulletins, notices, letters, policy manuals, and governmental regulations. Such materials differ from the expository and narrative texts used in most reading instruction, which are usually written to facilitate reading. Workplace communication is not necessarily well-written or targeted to the appropriate audience. Because the Reading for Information assessment uses workplace texts, the assessment is more reflective of actual workplace conditions.

The reading materials and related multiple-choice questions comprise five levels of complexity, with Level 3 being the least complex and Level 7 the most complex. Although Level 3 is the least complex, the questions require a level of reading skill well above simple decoding. The levels build on each other, each incorporating the skills assessed at the preceding levels.

Population:

Employable youth and adults

Format:

Paper-pencil, 45 minutes to answer 33 multiple-choice questions.

Scoring:

Scannable answer sheet

Technical Information:

Reliability is .80. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 31; Booklet, "Work Keys Reliability and Validity."

Assessment:

Work Keys® Teamwork

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

Listening
Problem Solving

Purpose:

The Teamwork assessment measures the examinee's skill in choosing behaviors and/or actions that simultaneously support relationships within the team and lead toward the accomplishment of work tasks. Examinees must recognize the goals of a team and identify ways to accomplish those goals in increasingly complex situations, such as those where the resources needed to accomplish a given task are not readily available.

Description:

The scenarios and questions are based on the actual demands of the workplace. Selections take the form of video presentations of teams in various workplace settings with a variety of problems or requirements. Examinees must identify the most appropriate teamwork responses to specific situations.

The assessment contains questions at four levels of complexity, with Level 3 being the least complex and Level 6 the most complex. Although Level 3 is the least complex, it still assesses a level of teamwork skill well above no skill at all. The levels build on each other, each incorporating the skills assessed at the preceding levels.

Population:

Employable youth and adults

Format:

The assessment is administered by VHS videotape and contains 12 teamwork scenarios, each accompanied by three multiple-choice questions, for a total of 36 items. The assessment is divided into two parts, approximately 40 minutes each.

Scoring:

Scannable answer sheet

Technical Information:

Reliability is .74. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 40; Booklet, "Work Keys Reliability and Validity."

Assessment:

Work Keys® Listening & Writing: Writing

Publisher:

ACT, Inc.
P.O. Box 168
Iowa City, IA 52243-0168
(800) WORKKEY

Potential Link to SCANS Skills:

Writing
Listening

Purpose:

The Writing portion of the Listening and Writing assessment measures the examinee's skill in writing work-related messages and summaries.

Description:

The assessment is administered via an audiotape which contains all directions and messages. Examinees are asked to listen to the audiotaped messages and then write messages or summaries based on the information they hear. Examinees are placed in the role of employees who receive information from customers, co-workers, or suppliers and must then write down the information to communicate it to someone else.

Population:

Employable youth and adults

Format:

Audiotape, 40 minutes to complete 6 responses.

Scoring:

Sent to ACT for scoring.

Scoring is based on the writing mechanics (such as sentence structure and grammar) and writing style used in the examinee's responses. It is not based on the accuracy and completeness of the information, although the responses must be related to the stimuli and convey the information clearly. Two or more raters read each message and assign it a score. Overall scores are then calculated to indicate the particular level of skill for each examinee. Skill levels range from 1 to 5.

Technical Information:

Reliability is .89. Validity evidence is based on content validity.

Source of Information:

Booklet: "Work Keys Test Descriptions," page 45; Booklet, "Work Keys Reliability and Validity."

Appendix D

Case Studies

Effective Practices for Teaching Essential Workplace Skills

Across the nation, interest is growing in how young people and adults can learn the workplace skills that are increasingly essential to success and advancement in employment. In 1991, the Secretary's Commission on Achieving Necessary Skills (SCANS) published *What Work Requires of Schools*. The SCANS report, as it is called, summarizes the commission's work to define and categorize the skills required in today's complex workplaces.[1]

In recent years, various efforts around the country have begun to turn the SCANS report's categorization and descriptions into standards, assessments, and curricular frameworks and materials that can guide and measure learning in schools, training programs, and workplaces.[2] In addition, many institutions are implementing professional development and other strategies that promote consistent and effective teaching and learning of these necessary skills.

ACT, Inc., and the U.S. Department of Labor asked Jobs for the Future to prepare a set of case studies that would highlight these innovative efforts to integrate the SCANS skills into learning programs for young people and adults—and to draw lessons for others wishing to advance this agenda in their institutions and communities. *Effective Practices for Teaching Essential Workplace Skills* is the product of this effort.

Jobs for the Future undertook the preparation of six case studies that reflect the diversity of institutions and programs committed to promoting effective and explicit teaching and learning of essential workplace skills.[3] These organizations include school districts, community colleges, and alternative education and community-based training and employment programs.

As a group, these efforts are noteworthy for their:

- Commitment to integrating SCANS skills into academic and workforce development learning programs;
- Effectiveness with populations of learners who have traditionally been hardest to serve;
- Emphasis on professional development strategies and other ways to strengthen experiential teaching; and
- Progress in institutionalizing and expanding the integration of SCANS skills into learning programs—in individual schools or districts or across multiple sites using a single program model.

The six case study sites are:

- *Work-Based Learning in Boston, Massachusetts:* A district-wide, work-based learning initiative organized around nine workplace competencies is central to Boston's high school reform strategy.

---

[1] Secretary's Commission on Achieving Necessary Skills. 1991. *What Work Requires of Schools: SCANS Report for America 2000*. Washington DC: U.S. Department of Labor.

[2] This report uses the terms SCANS skills, essential workplace skills, and workplace competencies interchangeably to describe a broad set of skills essential to success in the workplace.

[3] See Part III for summaries of the case studies; the full case studies follow Part III.

- *Horizonte Instruction and Training Center, Salt Lake City, Utah:* A non-traditional learning system links an alternative high school for students who have had little success in traditional high schools with a range of programs for adults and out-of-school youth seeking a high school diploma, GED, adult basic education, or ESL programs.

- *Long Beach City College, Long Beach, California:* One of the nation's largest community colleges, Long Beach City College incorporates SCANS skills into many of its courses, programs, and activities and encourages community partners in workforce development to do the same.

- *North Clackamas School District, North Clackamas, Oregon:* This suburban school district emphasizes project-based learning and work-based learning incorporating SCANS competencies for high school students, working with Oregon Worksite 21, a business-school partnership.

- *REAL Enterprises, Durham, North Carolina:* A national organization, 13 state organizations, and more than 200 local programs use entrepreneurship curricula and school-based enterprises to help young people and adults develop essential workplace skills.

- *YouthBuild Rockford, Rockford, Illinois:* An affiliate of both YouthBuild USA and AmeriCorps, YouthBuild Rockford serves out-of-school and adjudicated youth in a hands-on construction setting that emphasizes a broad range of SCANS skills in training as well as in leadership development, service learning, and academic components.

Part I of this report summarizes and synthesizes key lessons from these diverse and impressive learning programs. Part II takes a more detailed look at effective teaching and coaching strategies in the programs studied. It also describes and presents some of the tools and other materials that these programs have used to organize and structure their efforts. Part III briefly summarizes the more detailed case studies that follow.

Part I: Lessons Learned

In visits and interviews with program staff at the six case study sites, Jobs for the Future researchers focused on two critical sets of questions related to program design, quality, and scale:

- *Teaching and training practices that work:* What strategies are most effective for teaching SCANS competencies? Based on this assessment, what are the core principles of effective teaching and learning strategies for SCANS skills? Do these principles differ significantly for different kinds of learning programs and different population subgroups?

- *Institutional supports that promote sustainability:* What institutional systems and structures make it possible to implement effective practices on a significant scale and sustain progress over time? What are the elements of an infrastructure that can support effective teaching and learning strategies beyond a single teacher or program?

As Jobs for the Future sought to address these two questions, the case studies presented a composite picture of exemplary practices for helping a broad range of youth and adults develop the skills necessary for success in the workplace. Despite substantial differences among the six programs, Jobs for the Future found underlying consistencies that provide lessons about what it takes to organize effective teaching and learning of workplace competencies identified by the SCANS Commission and others.

The Lessons:

- The basic principles and strategies guiding quality teaching and learning of SCANS competencies are valid across a wide range of education and workforce development settings.
- Schools or programs that teach essential workplace skills effectively make the development of those skills central to their mission and instructional program.
- Essential workplace competencies are learned most easily when people practice those skills by performing valued tasks and functions.
- The richer the opportunities to use essential workplace skills in program tasks and projects, the more effective the learning program.
- Effective pedagogy is organized around a continuous-improvement cycle of *learn, practice, do, reflect.*
- Strong, sustained partnerships and connections with employers and community organizations are critical to contextual, experiential learning experiences, both inside and outside the classroom.

Lesson 1: The basic principles and strategies guiding quality teaching and learning of SCANS competencies are valid across a wide range of education and workforce development settings.

Jobs for the Future intentionally selected sites that vary significantly in their target populations, program goals, and institutional sponsors. We did so to highlight any significant differences in approaches to the teaching and learning of essential workplace skills. What we found, for the most part, were powerful commonalties among these programs' approaches and strategies—and in the assessments that staff of the six programs made regarding the core elements of effective practice. For example, across program types and populations served, project-based learning is a key instructional strategy.

Education and workforce development programs that appear to differ fundamentally may, in fact, have much in common—and much to learn from one another. Lessons about high-quality project-based learning in classroom or service-learning settings, for example, have direct relevance for summer youth programs and adult literacy and workplace learning initiatives, and vice versa. Lessons about effective work-based learning strategies in school-to-career programs have relevance for on-the-job training for incumbent workers or welfare-to-work programs aiming for retention and advancement.

Lesson 2: Schools or programs that teach essential workplace skills effectively make the development of those skills central to their mission and instructional program.

The programs in the six case studies embed explicit learning goals and clear performance standards for workplace competencies into curriculum, instruction, and assessment, and these goals and standards guide the actions of staff and learners. The learning goals and standards are not identical across the six sites, but all describe habits of mind and work, as well as personal qualities that are essential to success in the workplace. This is true whether the school or program directly uses the SCANS skills, as does Long Beach City College, or develops its own list of skills, such as the nine school-to-career competencies of the Massachusetts Work-Based Learning Plan, or uses state standards, such as the Oregon Career-Related Learning Standards in use in North Clackamas.

One way that several of the sites ensure that the teaching and learning of essential workplace skills stay central to the instructional program is through the development and use of individualized learning plans that specify which of these skills are to be learned and how that learning is to be assessed. Sites that have turned to this strategy include: Boston, which now uses the state's work-based learning plan; Horizonte Instruction and Training Center in Salt Lake City, Utah; and Long Beach City College's welfare-to-work program.

Lesson 3: Essential workplace competencies are learned most easily when people practice those skills by performing valued tasks and functions.

Learners develop essential workplace skills by performing tasks and projects that are important to them, provide a strong motivation and reason to learn, and require the use of workplace competencies. In the work-based learning and community-based service learning projects reviewed for this study, program participants benefit from a wide variety of learning-rich projects. The effectiveness of these programs rests primarily on the extent to which they engage students in tasks and projects that: 1) give a clear and compelling reason to learn workplace competencies; and 2) provide opportunities to use competencies to perform highly valued tasks and projects.

In any school setting, sparking the motivation to learn is critically important. This is especially challenging for programs serving youth and adults whose previous experiences with education has been largely negative, who may not know anyone with a college degree, and who live in neighborhoods where few people have full-time, family-supporting jobs. While insufficient in itself, motivation is the starting point for learning: as all teachers know, you can lead a student to knowledge but you can't make them learn. A robust body of cognitive research reveals that how much people learn depends largely on how much effort they make. To make an effort, people must see a reason.

One approach, common to all six programs, is to help students believe that hard work opens the door to economic opportunity. The reality test for this self-interest approach is the set of opportunities that successful program completion provides —the kinds of jobs participants can get, keep, and advance in.

YouthBuild Rockford and Horizonte, which serve very-low-income youth and adults whose education and skill levels severely limit their economic opportunities, also emphasize opportunities to serve others and meet important community needs. In fact, service opportunities provide strong motivation to learn essential workplace skills. For YouthBuild Rockford students, addressing homelessness and inadequate housing for low-income people in their community provides a rich context for developing leadership, communication, teamwork, and problem-solving skills. The chance to contribute to the community is a key element of

Horizonte as well. Horizonte students develop and teach lessons in order to help fourth graders avoid the mistakes the older students had made and develop social skills that the older students now realize could have made a difference for them. In carrying out this project, the Horizonte students learned skills that will help them succeed in the workplace *and* become part of the solution to community problems.

Lesson 4: The richer the opportunities to use essential workplace skills in program tasks and projects, the more effective the learning program.

To become proficient at solving problems, learners need opportunities to solve unstructured or semi-structured problems and see whether the solutions work. It is the same with all performance-based workplace competencies—developing them happens best when learners use those competencies to achieve an important purpose. While project-based learning in the classroom provides students with opportunities to become problem-solvers, the full development of essential workplace skills requires high quality work-based experiences as well. The North Clackamas School District and YouthBuild Rockford use the 6 A's developed by Adria Steinberg of Jobs for the Future as guiding principles for designing and teaching high quality problem-based projects.[4]

A high school internship in Boston's Roxbury Multi-Service Center is an excellent example of a high-quality work-based learning experience. The student drafted outlines and designed written exercises and flyers for workshops and other education programs. For these workplace tasks, she consulted agencies about requests for educational services, attended workshop recruitment meetings, promoted programs through site visits and other activities, and worked with team members and other colleagues at the center to organize education events. At times, the center gave her particularly challenging tasks. For example, she developed new ways to present sensitive information, such as rape-awareness information, to the public, and specifically to teens. Based on her performance, the center promoted the student to the position of team leader. The student did the same work as adult employees—work that required her to use high-performance competencies—and was held to real-world performance standards. And her work had real consequences for the people the organization serves.

Using Essential Workplace Skills

High-quality tasks and projects at the case study sites provide opportunities for learners to:

- Create and carry out project plans and schedules;
- Work in teams to perform tasks or produce products;
- Serve clients or customers;
- Exercise leadership;
- Work well with people of diverse backgrounds;
- Acquire, evaluate, and use information;
- Use computers and other technology to perform tasks;
- Communicate effectively with diverse audiences using a range of media;
- Think creatively and make decisions;
- Identify and solve semi-structured problems; and
- Exercise responsibility, self-management, and integrity.

---

[4] Steinberg, Adria. 1997. *Real Learning, Real Work: School-to-Work as High School Reform.* New York: Routledge.

Certainly, not all tasks and projects offer the same potential for learning essential workplace skills. These six programs stand out in their commitment to developing learning-rich work-based learning opportunities. North Clackamas, for example, emphasizes projects that challenge students to use essential workplace skills at high levels of sophistication. The same projects that require North Clackamas students to solve actual workplace problems or create community policing plans could, with adjustments, become case projects in management school. Similarly, in developing business plans in REAL or through service learning in Horizonte and YouthBuild, youth and adults apply workplace competencies in doing work that matters.

The push for quality becomes more challenging with large-scale work internship programs. In Boston, which has been engaged for over a decade in providing work-based learning for significant numbers of high school students, industry sectors vary significantly in the opportunities they offer to use workplace competencies at a high-skill level. According to a 1998 survey of workplace supervisors, only about 25 percent of student placements were in high-end jobs; about 17 percent were in low-end jobs and more than 50 percent in mid-range jobs. Students with placements in the social service sector were more than twice as likely as those in other sectors to perform jobs that required a large number of competencies at a high level of complexity and skill. In contrast, 33 percent of retail placements were in low-end jobs; only 11 percent were high-end jobs.[5]

According to that same survey, student interns in Boston are more frequently expected to reach higher levels of skill on some work-based competencies than on others. For example, only 6 percent of interns performed more than simple arithmetic computations, and 27 percent of the jobs required no math. Planning and decision making were not a job responsibility for 44 percent of the interns. At the same time, 33 percent of the work-based learning students had jobs that asked them to perform more than one multi-step task simultaneously, while only 9 percent performed only simple one-step tasks.

This variation is valuable information for program planners: it identifies placements that emphasize *learning* in the context of doing a job, not just performing tasks repetitively. Performance indicators (like those used to conduct the Boston survey) help employers adjust the tasks or projects they assign to interns. The challenge is to design tasks and jobs that meet employers' immediate workforce needs while contributing to long-term learning.

Lesson 5: Effective pedagogy is organized around a continuous-improvement cycle of *learn, practice, do, reflect.*

All six programs organize teaching around a structured combination of learning by doing, learning in class, and reflection on lessons. They integrate skill-building with opportunities to practice skills, use competencies in real-world situations, and improve performance through assessment, feedback, and reflection.

On the one hand, essential workplace skills, or any performance-based competencies, cannot be learned in the classroom alone. A person can learn *about* basketball or ballet by reading books or attending lectures, but to *become* a proficient basketball player or ballet dancer requires practice. The same is true of working effectively in teams, making decisions, solving problems, or mastering the other essential competencies identified in the SCANS report (see figure, page 10, What Employers Want: The SCANS Competencies and Foundation Skills).

At the same time, the case studies demonstrate the limits of unstructured, unreflective doing without learning. Playing basketball without a coach is a poor learning strategy—as is working without on-the-job training or mentoring. These programs *integrate learning and doing*: students know they are learning skills they will need in performing tasks or projects that are part of their education program. Tasks and projects build on the knowledge and skills students learn and provide opportunities to practice new skills, strengthen them through feedback and reflection, and use them to perform meaningful work. (See Part II for a more detailed description of pedagogical strategies.)

---

[5] Jobs for the Future/Private Industry Council. June 1998. *Benchmark Communities Initiative Supervisor Survey*. Boston Private Industry Council, Boston Public Schools School-to-Career Office, and Jobs for the Future.

Lesson 6: Strong, sustained partnerships and connections with employers and community organizations are critical to contextual, experiential learning experiences, both inside and outside the classroom.

Each site we studied has developed extensive, sophisticated partnerships that structure and sustain linkages with employers or other community resources. Effective infrastructure to support quality and scale is critical to what makes the six programs exemplary, and it is key to the field's ability to replicate successful practices. Both YouthBuild and REAL Enterprises have advanced from pilots into national programs, with implementation in many states and communities. Each has developed a highly effective infrastructure that makes it possible to expand in scale and maintain quality control. And in each case, the relationship between the national organization and local sites is critical: local programs have the flexibility to adapt to local needs and conditions, while the national organization provides significant, ongoing support through a framework, guiding principles, and tools. The essential role of tools and staff development is clear in the development of YouthBuild and REAL Enterprises. For example, REAL's detailed curriculum, tested teaching activities, professional development, and technical assistance provide a strong foundation for expansion with quality.

Boston's progression from a youth-apprenticeship program and a youth jobs program into a well-established, growing *system* of work-based learning has been the result of an evolving infrastructure with three key structures. First, a high-level, multi-stakeholder, leadership body provides strategic direction, oversight, and political support for work-based learning and school-to-career. Second, a highly effective intermediary organization—the Boston Private Industry Council (PIC)—develops, maintains, and strengthens the ongoing connections among schools, students, and employers that are central to implementing high-quality work-based learning on a significant scale. Third, key stakeholders have agreed on a set of workplace competencies that define what students need to know and be able to do. Supporting that agreement is a tool—the Massachusetts Work-Based Learning Plan—that focuses students, supervisors, and PIC staff on using work-based learning experiences to help students develop and strengthen competencies.

Horizonte has developed a unique system that links an alternative public high school with a range of programs for adults and out-of-school youth. This enables Horizonte to implement effective teaching practices across diverse program types and populations, integrating multiple public and private funding streams to provide a coherent set of education and training programs guided by a distinct philosophy and set of principles. Horizonte has created a broad set of partnerships with public, private, and non-profit institutions, making it possible to serve multiple populations in 25 community-based satellite locations throughout the city, as well as its main campus.

In North Clackamas, the school district, schools, the state, and the business community mutually support and reinforce one another's interest in at least two areas: 1) implementing contextual learning strategies for teaching essential workplace competencies; and 2) creating opportunities for work-based and community-based learning on a scale that will benefit a significant and growing number of students. A strong foundation for moving towards greater scale and improved program quality comes from: the alignment of state learning standards and assessments with the district's commitment to focused professional development; district efforts, such as reorganizing high schools into focused programs of study for juniors and seniors; graduation standards that emphasize contextual learning and essential workplace skills; employer commitments to provide quality work-based learning experiences; and strong impetus for reform within schools.

Long Beach City College uses its place within a set of partnerships with K-12 education, four-year colleges, and workforce development and adult education programs to infuse teaching and learning SCANS skills into a variety of programs within the college as well as initiatives in the community, such as welfare-to-work programs. Tool development and a consistent focus on SCANS skills have made it possible for Long Beach City College to broaden the relevance of those skills within the college and to further their incorporation throughout the state community college system.

What Employers Want: The SCANS Competencies and Foundation Skills

Five Competencies

Resources: Identifies, organizes, plans, and allocates resources

A. Time

B. Money

C. Materials

D. Human resources

Interpersonal: Works with others

A. Participates as member of a team; contributes to group effort

B. Teaches others new skills

C. Serves clients or customers

Works to satisfy customers' expectations

D. Exercises leadership

E. Negotiates

F. Works with diversity

Information: Acquires and uses information

A. Acquires and evaluates information

B. Organizes and maintains information

C. Interprets and communicates information

D. Uses computers to process information

Systems: Understands complex relationships.

A. Understands systems

B. Monitors and corrects performance

C. Improves or designs systems

Technology: Works with a variety of technologies

A. Selects technology

B. Applies technology to task

C. Maintains and troubleshoots equipment

A Three-Part Foundation

Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens, and speaks

A. Reading

B. Writing

C. Arithmetic/Mathematics

D. Listening

E. Speaking

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons

A. Creative thinking

B. Decision making

C. Problem solving

D. Seeing things in the mind's eye

E. Knowing how to learn

F. Reasoning

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty

A. Responsibility

B. Self-esteem

C. Sociability

D. Self-management

E. Integrity/Honesty

Part II: Effective Teaching and Training Strategies

The six programs that Jobs for the Future studied integrate learning and doing: students know that the skills they are learning will be needed to perform tasks or projects in their learning program. In these programs, teachers and trainers use *instructional* strategies—built on successful coaching strategies—that enable students to get the most out of projects. These strategies involve the integration of learning, practice, performance, assessment, and reflection.

In the chart below, the cycle of learning, practicing, doing, and improving illustrates what these teachers are trying to accomplish as they move students from the simple to the more complex and from close supervision to increased independence. This is a time-tested strategy for developing proficiency at performance-based competencies, whether they be essential workplace skills, athletics, or the arts. In each program, either explicitly or implicitly, this progression is built into the teaching and learning of SCANS skills.

Progression of Learning and Doing

From ➔	Toward ➔	To
learn	practice	use in real situation
close supervision	less supervision	more independence
single skill	more skills	use multiple skills to perform task
simple tasks	more complex tasks and simple product	highly complex tasks and final product
beginner skill level	higher skill level	high performance skill level
learner standards	higher standards	real-world standards—masterpiece showing proficiency
assess knowledge	assess practice	assess final performance
apprentice	journeyman	master
do	reflect	revise and improve

TheYouthBuild Rockford leadership development program provides a good example of how this structured progression can guide instructional practice. In classes focused on leadership development, participants learn a broad range of leadership skills. They have ample opportunities to practice these skills in the classroom, as members of an elected Youth Policy Council that shares in program governance, as worksite crew foremen, and through community service and civic involvement. As participants progress in the program, they exercise leadership in increasingly real situations with progressively higher stakes and consequences.

Other programs we studied also embed the cycle of learning, doing, and reflecting in strategies for teaching essential workplace skills. REAL Enterprises students learn and practice skills in the classroom through a structured experiential curriculum, then combine and use those skills to develop actual business plans. In North Clackamas, students develop solutions to real workplace problems in quality-improvement teams.

In many respects, this approach is similar to the apprenticeship model of learning:

- Apprentices learn skills from a master, then observe as the master performs those skills in work settings.
- Apprentices practice skills under the watchful eye of the master, getting feedback and correction, until they can meet quality standard. Apprentices progress from practicing simple skills by themselves to practicing more complex skills in combination and from close supervision by the master to increasingly independent practice.
- Apprentices use the skills to create a real product, progressing from the simple to the more complex. The cycle of doing, feedback, reflection, and improvement based on feedback and reflection continues.
- Apprentices create a masterpiece, a culminating piece of work that demonstrates proficiency to be a master in the trade, occupation, or profession.

Teaching as Coaching

In the six programs Jobs for the Future studied, teachers and trainers act as coaches or facilitators, not as "traditional teachers" who stand in front of a class and provide information. The teaching methods these programs employ recognize that most students learn essential workplace skills best wnen they are active learners rather than passive recipients of information. Teachers and trainers use five key and common coaching strategies that are summarized in the box and described in greater detail below.

Summary: Five Successful Coaching Strategies

- Explicit goals and high standards
- Focus on effort as well as achievement
- Individualized learning plans
- Skill-building instruction, practice, and rehearsal
- Assessment, feedback, and reflection that drive continuous improvement

Successful coaches use all these interrelated teaching strategies in a flexible, individualized way. That is, coaches must know the "right buttons" to push to motivate each person and be able to adapt strategies to changing situations. To do that well requires ongoing assessment of performance, which is the engine that drives coaching. Coaches constantly revise teaching and learning to maximize continuous improvement for each individual and for the team: the challenge is to determine how to help individuals and the team move to a higher level, whatever their current level of performance. What distinguishes successful coaches is their effectiveness at assessing current performance in relation to the skills required, using ongoing assessment to set priorities for improvement, and creating learning experiences that move performance in the direction of achievable yet challenging standards.

Explicit Goals and High Standards

For coaches, standards are based on what it takes to succeed in the real world. Good coaches help learners develop a clear picture of what high performance looks like—a definition of quality, a goal to strive towards. It would constitute "professional misconduct" for a coach to set individual or team standards and expectations below what it will take to win. Coaches also use techniques that help individuals take personal ownership of high standards. A coach develops strategies that get each individual to set his or her sights higher, recognizing that every learner has different goals and standards—to play in high school, earn a college scholarship, play professionally, or make the all-star team.

In all the programs we studied, explicit learning goals for developing essential workplace skills provide a framework for curriculum, instruction, and assessment, whether it be SCANS skills at Long Beach City College, nine school-to-career competencies in Boston's use of a work-based learning plan, or the Oregon Career-Related Learning Standards in North Clackamas. Horizonte has a clear focus on reading, writing, math, and technology across its programs, and it is beginning to identify a small number of essential workplace skills that will become an additional school-wide focus.

Real world performance standards are evident in several programs. In their quality-improvement and community-policing projects, the standard is how well North Clackamas students develop solutions to workplace and community problems that would work in the real world. For REAL Enterprise students, the standard is their business plan's effectiveness for starting a viable business. Horizonte students who winterize the homes of low-income elders measure success by how much their efforts reduce heating costs. For YouthBuild Rockford students, the standard is the quality and affordability of the housing they build.

Focus on Effort as Well as Achievement

Coaches recognize that persistent effort is critical to learning and improvement. "Natural ability" is a floor for achievement, not a ceiling—coaches act on the belief that performance equals "ability" plus motivation, effort, and willingness to learn. For good coaches, performance is the litmus test of learning. It is not simply what you know but how you use what you know that counts.

In the programs we studied, staff send a consistent message that work and effort, not "ability," determine success. Students are treated as individuals and with respect. The emphasis on practice and rehearsal, leading to performance assessment based on high, real-world standards conveys a clear message that everyone who works hard can succeed. As a result, students come to feel that the programs care about them as learners and as people.

In Horizonte and YouthBuild, where the youth and adults they serve have experienced little education or workplace success, the first challenge is to get students to believe in their own potential to learn. One way the programs motivate students to put in a persistent effort is through engaging them in service learning projects. Helping elderly people save money on heating, helping fourth graders develop social skills that would have made a difference in their own lives, building housing for homeless or low-income people, or helping a community organization meet community needs give students a sense of purpose and reason for learning. Opportunities to assume leadership within the program and in the community give YouthBuild students even more motivation to invest in their learning. Similarly, the chance to help themselves and their community by taking advantage of untapped economic opportunities provides strong motivation for REAL entrepreneurship students.

Individualized Learning Plans

Successful coaches develop individualized learning plans based on the skills required to perform the work and an initial assessment of an individual's level of competency in each. Learning plans identify the skills that are the highest priority learning goals and the structured experiences that will help develop and improve those skills. Coaches regularly revise learning plans as individuals develop skills and as learning priorities change.

The Massachusetts Work-Based Learning Plan is the foundation for individualized workplace learning plans in Boston. It is used to identify the job description and tasks a student will complete, select three to five competencies most critical to the job, assess initial competency level, set goals in key competency areas, identify opportunities to learn the competencies on the job, and develop an individualized learning plan to achieve the goals. Follow-up assessments document learning and productivity gains on the job.

Horizonte uses the state Student Education Occupation Plan to help students and adults develop individualized learning plans focused around six district learning goals aligned to essential workplace competencies. Upon enrolling and at the beginning of each year, students, parents, and school staff develop one-year goals, an action plan for achieving the goals, and a means for evaluating progress.

The Long Beach Welfare-to-Work initiative, a pilot site of the SCANS 2000 Career Transcript program, uses the AlignMark's AccuVision Systems, and the AES SCANSkill ID rubric to develop workplace learning plans for participants. The assessments are used to assess participants' job-related skills, identify strengths and weaknesses, develop strategies for personal development, and identify the SCANS skills that are most critical to their job and the level at which the skills need to be performed.

Skill-Building Instruction, Practice, and Rehearsal

Effective skill-building instruction reinforced by continuous practice and rehearsal is a critical part of successful coaching at every level. Even at the professional or Olympic level, athletes learn and hone the "fundamentals." The most effective coaching practices are based on just-in-time teaching: skills are taught in the context of where and how they will be used, and learners see a clear reason why they are learning. Good coaches use ongoing, individualized skill assessment, as well as an analysis of the skills required for the job, to design and revise skill instruction and practice.

REAL Enterprises employs a continuous cycle of skill instruction and practice that enables students to develop the skills they will need to create a business plan. The REAL curriculum, developed and refined by experienced REAL teachers, provides a structured sequence of instruction and practice to help students progressively learn the skills they will need to develop business plans. *REAL Class Activities* provides 122 specific class activities, each of which demonstrates a component of developing a business plan, uses active learning techniques, and gives ideas for student reflection. *REAL Individual Activities* provides more than 200 skill-building student activities.

YouthBuild Rockford integrates leadership development skill building with opportunities to practice leadership skills in structured settings and to use them to achieve goals in real situations. Students take a weekly Leadership Development Skills Class and also work on their leadership skills in the Crew Foreman training class. They practice and use leadership skills in the program's governance system, as worksite crew foremen and in community service activities.

Assessment, Feedback, and Reflection that Drive Continuous Improvement

For coaches, performance is the raw material for learning. "Mistakes" are opportunities to learn how to improve. The cardinal sin is not a mistake but rather not learning from the mistake. Ubiquitous assessment, feedback, and reflection are the tools coaches use to move performance in the direction of desired standards. While assessment is used to make decisions about which players to keep and how much to pay them, its primary role is to help each individual succeed. There is no place for the bell curve in coaching. A coach wants a team where everyone is a winner.

Individualized assessment is the cornerstone of preparation for a game. Players and coaches spend a lot of time watching films and assessing priorities for improvement—and strategies for the next game. Success depends on several things: the accuracy of the assessment, the prioritization of learning goals, players' success in reflecting upon and internalizing those priorities, players' motivation and effort. It also depends on the coach's ability to design appropriate individual and team learning experiences.

A number of the programs studied use assessment tools to identify skills required to do the work, design effective learning experiences, and measure progress: the Massachusetts Work-Based Learning Plan; teacher-designed rubrics for career-related competencies in North Clackamas; and AlignMark's AccuVision Systems and AES SCANSkill ID rubric in Long Beach.

Effective use of assessment for teaching essential workplace skills is the area that presents the greatest need and potential for improvement in the programs studied, as in the education and workforce development fields in general. It is here where education and training have the most to learn from coaching. Too often, assessment in education is used to track students and sort where they fall on the achievement curve—not to help students improve their performance or help each student succeed. Change in this area will require continued development of simple and feasible yet effective assessment tools that provide the information needed for continuous improvement and learning—as well as significant change in the way most schools and training programs think about assessment and use assessment tools.

Resource Guide to Tools and Strategies[6]

Work-Based Learning in Boston, Boston, Massachusetts:

Jobs for the Future/Private Industry Council Benchmark Communities Initiative Supervisor Survey. Boston Private Industry Council, Boston Public Schools School-to-Career Office, and Jobs for the Future; and *Boston Supervisor Survey Findings and Recommendations*, Jobs for the Future, 1999.[7]

Findings and Recommendations analyzes responses to *Supervisor Survey* to determine the overall quality of PIC-sponsored work-based placements, factors that make a difference in the quality of work-based learning, and what employers get out of participating in work-based placements.

Boston STC Measurement Framework: What Are We Measuring? and *Detailed Description of Student Outcome Measures, 1999.*

The School-to-Career Partnership uses the framework to assess progress in implementing key restructuring practices by high schools, employers, postsecondary institutions, and community-based organizations and to measure the impact of reform practices on student outcomes. It was developed through a collaboration of Jobs for the Future, the Boston Private industry Council, and the Boston Public Schools School-to-Career Office.

The Massachusetts Work-Based Learning Plan, Massachusetts Department of Education, 1999.

The Work-Based Learning Plan is a tool to assess student skill levels in nine broad competency areas, identify the competencies most relevant to work-based learning job descriptions and placements, and assess student progress. The Massachusetts plan is largely in part on the Boston version, which was developed by the Boston Private Industry Council in collaboration with the Boston Public Schools School-to-Career Office, Jobs for the Future, and employers involved in the School-to-Career Partnership.

Horizonte Instruction and Training Center, Salt Lake City, Utah:

Horizonte: Where Students Come First, Horizonte Instruction and Training Center, 1999.

Provides in-depth information about Horizonte's non-traditional structure, community partnerships, youth and adult student populations, and educational programs.

Horizonte Instruction and Training Center Service-Learning Leader School for National Service-Learning Leader School Application, 1999.

Provides information about service learning strategies.

Salt Lake City School District S.E.O.P. Student Education Occupation Plan; and Adult Student Education Plan.

Horizonte uses this state and district tool to help students develop individualized learning plans that incorporate district learning goals aligned to SCANS skills.

---

[6] Except where otherwise noted, see contact information at the end of each case study for further information.

[7] For further information, contact Jobs for the Future, 88 Broad Street, Boston, MA 02110; (617)728-4446.

Long Beach City College, Long Beach, California:

SCANS: Teaching Life Management Skills in California Community Colleges can be purchased ($30) from the LBCC Bookstore, 4901 East Carson St., Long Beach, CA 90808. It is also a key source for a more formal textbook and instructor's guide by Joann Driggers: *Life Management Skills: Taking Charge of Your Future* (Delmar Publishers, 1998).

For more information about the SCANS 2000 Welfare-to-Work Program and Career Transcript System, visit the SCANS 2000 Center's Web site at www.scans.jhu.edu.

AlignMark's AccuVision Systems.

AccuVision is an interactive assessment tool that uses video, computer, and job simulation to measure job-related skills. The feedback report generated includes a skill ranking, analysis of the individual's strengths and weaknesses in the tested area, and strategies for personal development. For more information, go to the Web site: www.alignmark.com. The SCANS 2000 Center has posted a presentation regarding AccuVision and the Career Transcript System at: www.scans.jhu.edu/WtW/Presentations/AlignMark/assessment/ppframe.htm.

AES International Skill Coach Assessment forms.

Worksite supervisors use this assessment tool to apply a rubric of all 37 SCANS skills to the *position* the welfare-to-work participant will hold, not to the individual. This process determines yields six skills most critical to success in the job and the level to which those skills will need to be performed. An "Employee Performance Assessment" form is then created. For more information on ADVANCE Educational Spectrums, Inc., go to: www.skillcommand.com.

North Clackamas School District, North Clackamas, Oregon:

Graduation Requirements Design Team Report: Phase 2, North Clackamas School District, 1998.

Describes the alignment of graduation requirements to Certificate of Advanced Mastery and district education reform goals, including Career-Related Learning Standards, Senior Projects, Career-Related Learning Experiences, and Focused Areas of Study.

North Clackamas School District: District Action Plan, 1999.

Provides in-depth information about the district's education reform strategy and systems and structures that support reform.

Certificate of Advanced Mastery Guide for Schools, Oregon Department of Education, 1998.[8]

Oregon's Certificate of Advanced Mastery includes detailed information about state Career-Related Learning Standards, Career-Related Learning Experiences, and five Endorsement Areas.

The Bigger Picture, Oregon Worksite 21, 1999.

Oregon Worksite 21 helps employers develop and maintain partnerships with education. *The Bigger Picture* is a tool for employers working with students and teachers in school-to-career activities. The tool features a 250-page guide to planning employee workshops on school-to-career topics and in interactive CD-ROM for employees to explore school-to-career information on their own. These tools help teach employees how to mentor students through job shadows, internships, and classroom-speaking and school projects, as well as how to mentor educators through site visits and teacher internships.

---

[8] Available from Oregon Department of Education, 255 Capital Street NE, Salem, OR 97310-0203; Phone: (503)373-7968.

The Six A's, Steinberg, Adria. 1997. *Real Learning, Real Work: School-to-Work as High School Reform*. New York: Routledge.[9]

The Six A's is a set of principles for high-quality problem-based learning based on standards for Authenticity, Academic Rigor, Applied Learning, Active Exploration, Adult Relationships, and Assessment. Teachers use the tool to design, teach, and improve problem-based projects.

REAL Enterprises, Durham, North Carolina:

REAL Entrepreneurship Curriculum Guide.

Developed by experienced REAL teachers and field-tested, the *Curriculum Guide* includes an Implementation Guide; Teaching Guide; REAL Class Materials; and REAL Individual Activities. The *Teaching Guide* provides teachers with guidance in developing the content, sequence, and methodology of a REAL course. The guide contains course outlines, a summary of teaching methods, and a sequence that describes how to create, develop, and implement a business plan. *REAL Class Activities* contains 122 specific class activities, each of which demonstrates at least one component of developing a business plan, uses active learning techniques, and gives ideas for student reflection. *REAL Individual Materials* provides more than 200 distinct student activities including a wide variety of projects designed for students to complete while working independently on their business plans.

YouthBuild Rockford, Rockford, Illinois:

For more information about YouthBuild Rockford, contact the Web site: http://www.youthbuildrockford.org.

YouthBuild Rockford Charter School Application, 1999.

Provides in-depth information about YouthBuild Rockford's orientation program, educational and job training services and activities, including service learning, leadership development, and project-based learning strategies.

YouthBuild Rockford's Leadership Development curriculum, n.d.

YouthBuild Rockford's leadership development activities are designed to develop personal development skills and knowledge, group effectiveness skills, and influencing skills and community leadership.

---

[9] For further information, contact Jobs for the Future, 88 Broad Street, Boston, MA 02110; Phone: (617)728-4446.

Part III: Case Study Summaries

The six case studies show an exciting range of institutions that are putting into place the foundations of innovative and powerful programs to teach essential workplace skills. They are succeeding with diverse groups of learners, from at-risk youth and adults seeking General Equivalency Diplomas or English as a Second Language skills to high school and college students from middle-class backgrounds. To achieve these results, the programs use innovative instructional strategies. They are embedding workplace skills in standards and assessments, making deep connections with a variety of external resources, and building infrastructure for quality and scale.

Certainly, these programs and schools are all still in process. Yet these institutions and their instructional programs for essential workplace skills show potential and point toward future expansion and strengthening of these efforts.

Work-Based Learning in Boston, Massachusetts

The Boston Private Industry Council organized and coordinates a high-level, longstanding partnership among employers, the school district, and higher education that has developed a well-organized system of work-based learning for high school students in Boston and created transitions to economic and further educational opportunities. Work-based learning has expanded in scale and improved in quality for more than a decade as the result of systems and structures that sustain progress and build a foundation for continued growth.

Boston's work-based learning system has two strands: the ProTech school-to-career program, which has its roots in a small youth apprenticeship program begun by the PIC in the early 1990s, and the Jobs Collaborative, which grew directly from the PIC's original private-sector summer jobs program in the early 1980s. As school-to-career and work-based learning move from opportunities for some students to a strategy for wall-to-wall reform in most Boston high schools, there is a need to increase the scale of work-based learning significantly while maintaining and improving the quality of learning. The cornerstone the work-based learning system are multi-stakeholder agreement around the competencies that are essential for students to know and be able to do and the development of the Massachusetts Work-Based Learning Plan to assess student performance and the quality of workplace learning experiences—both created with intensive employer involvement.

Key Lessons

Boston's work-based learning system provides important lessons about 1) effective practices for teaching essential workplace skills; and 2) systems and structures to implement effective work-based learning on a large scale while maintaining quality.

- Employer involvement, organized in Boston by the PIC and statewide by the Department of Education, was critical in designing Boston's work-based learning system and the Massachusetts Work-Based Learning Plan.
- The Massachusetts Work-Based Learning Plan is an effective organizational and assessment tool because it emphasizes broad, transferable competencies, accompanied by a developmental rubric to assess levels of competencies.
- The user-friendly format of the Massachusetts Work-Based Learning Plan facilitates widespread adoption.

- Boston's internship coordinators are essential to maintaining and improving the quality and quantity of work-based learning experiences.

Horizonte Technical and Instruction Center: Salt Lake City, Utah

Horizonte is a non-traditional learning system that links an alternative high school for students who have had little academic success with a range of programs for adults and out-of-school youth seeking a high school diploma, a GED, or adult basic education, or to learn English as a second language.

Horizonte serves 1,800 high school students, 180 young parents, 3,600 ESL students, and 4,500 non-ESL adults. In addition to the main site, students learn at 25 satellite locations throughout Salt Lake City. Horizonte also helps students learn outside of the classroom through partnerships with 50 public, private, and non-profit agencies. There is a strong focus on learning reading, writing, math, and technology through hands-on experiential learning, service learning, and occupational programs that require students to learn and use essential workplace skills.

Key Lessons

In moving away from a narrow academic focus and traditional teaching, Horizonte incorporates a number of effective practices for teaching essential workplace skills and improving academic achievement for its students:

- Horizonte's deep commitment to helping students learn the skills necessary to become productive and economically self-sufficient provides a strong foundation for teaching and learning essential workplace skills. Its explicit emphasis on specific SCANS skills, such as reading, writing, math, and technology, provides a clear, school-wide focus for teachers and students.

- Horizonte's student-centered values are critical to the teaching of foundation skills and workplace competencies. The program builds on each student's individual experiences and strengths, shaping the curriculum to meet student needs and learning styles. When a student struggles, academically or socially, it means the school has yet to create conditions in which he or she can flourish.

- Horizonte's non-traditional structures—such as community-based locations, a year-round, extended-day schedule, and the linkage of adult education programs with a high school—make it possible to serve a broad range of youth and adults who have previously not been successful in school and to build strong community partnerships that help create productive learning environments for these students.

Long Beach City College: Long Beach, California

Long Beach City College, one of the nation's largest community colleges, incorporates SCANS skills as a central focus of many courses, programs, and activities. It uses multiple strategies to make SCANS skills a unifying basis of teaching and learning, with a flexible approach that has an impact, both internally and in partnership with workforce development programs and other community colleges. Using multiple approaches makes it possible to match instructional strategies both to the goal and to the learner. Another advantage is to keep SCANS skill development central to all activities, rather than a separate piece of certain activities.

LBCC is embedding SCANS skills in Students and Teachers Achieving Results, a small learning community for students with very low reading and math skill levels; the School of Trades and Industrial Technologies; the

Tech Center, which provides supplemental, multimedia instruction to technical coursework; and an innovative welfare-to-work program in partnership with the SCANS 2000 Center of Johns Hopkins University. SCANS skills are also central to the Life Management program. LBCC provided leadership in bringing together Life Management instructors from 12 California community colleges to share teaching resources and strategies, leading to a catalog of instructional resources and teaching strategies that the Chancellor's Office has distributed to all 106 California community colleges.

Key Lessons

LBCC's experience provides valuable lessons for effective teaching practices and change strategies for connecting postsecondary education to the SCANS skills:

- LBCC is explicit about SCANS development and uses multiple approaches to developing SCANS Skills.
- LBCC builds institutional and community awareness and understanding of SCANS in a number of ways, many of them quite simple.
- Not only are workplace readiness and the development of high-performance skills central to postsecondary education at LBCC, but the college uses its relationships with its partners in both education and workforce development to promote broader use of SCANS.
- LBCC uses the national, state, and local systems in which it operates to reinforce its SCANS focus and help the school provide incentives for including SCANS in all work.

North Clackamas School District: North Clackamas, Oregon

In the North Clackamas district's systemic approach to education reform, teachers, schools, the school district, the business community, and the state all play important roles in creating opportunities for project-based learning and career-related learning experiences. Initiatives at the district and local level and among employers mirror priorities in the state's far-reaching 1991 education legislation, which tied reform to workforce development and identified specific content and performance standards for student achievement. These efforts reinforce one another in making contextual project-based learning in schools, workplaces, and the community a major focus of teaching and learning for a significant and growing number of students.

North Clackamas demonstrates what can be accomplished through an active partnership among high schools, a school district, the state, and employers and an intermediary organization. A significant and growing number of teachers and school administrators are making contextual project-based learning a major focus of instruction. The district has made a long-term commitment to professional development in contextual project-based learning; it is also implementing graduation requirements that emphasize career competencies, organizing high schools into focused programs of study around broad career areas, and helping teachers to develop learning opportunities in the workplace and community. The Oregon Education Act for the Twenty-First Century, the state's education reform policy, incorporates performance-based workplace competencies and requires high schools to provide opportunities for career-related workplace and community learning experiences. Oregon Worksite 21, which builds partnerships between employers and schools, is helping business provide quality work-based learning experiences.

Key Lessons

North Clackamas provides important lessons about state, district, school, and business community practices for creating, sustaining, and expanding the effective teaching of essential workplace skills:

- The school district, in collaboration with business partners, provides opportunities for students to work on projects of real value to the school and larger community. This teaching strategy has proven to be effective for learning foundation skills and essential workplace competencies.

- Focused professional development, explicit learning standards, and strong community partnerships are critical to efforts to provide opportunities for large numbers of North Clackamas students to learn high-performance competencies in the workplace and the community.

- As North Clackamas moves toward reform on a scale that reaches all students, it benefits from the alignment of systems and structures among schools, the school district, the state, and the business community. This has created a change process in which the actions of each of these groups reinforce those of the others. Without alignment, policies and practices at any level can be serious obstacles to reform at other levels.

REAL (Rural Entrepreneurship through Action Learning) Enterprises: Durham, North Carolina

REAL Enterprises, a loose federation of a national organization, 13 state organizations, and over 200 local sites, is a high-quality program centered around the preparation of a business plan to create, and, in many cases, operate, a new business. Students develop essential workplace skills through REAL's highly developed, experiential, entrepreneurship curriculum. The program offers many opportunities to practice the skills students learn, and then to use those skills to create a detailed plan for starting a business of their choice.

National REAL provides a proven, and constantly evolving, curriculum and extensive professional development, enabling the program to grow in scale and quality. The program serves middle school and high school students, community college students, and adults seeking to start a business.

Key Lessons

REAL provides important lessons about 1) effective practices for teaching essential workplace skills; and 2) systems and structures to implement effective practices on a large scale while maintaining quality.

- Experiential, real-world learning—the creation of an actual business plan—highly motivates REAL students to benefit from their education. REAL students can find an immediate, practical, real-world application of classroom concepts.

- Effective national and state-level systems, materials, and programs support local practice and make it possible for REAL to expand a skills-based program to many sites while maintaining quality. REAL's comprehensive, field-tested curricular materials are fully developed, and teachers in a variety of settings have used them over several years to maintain program quality. Sustained professional development helps REAL instructors strengthen their practice of experiential, student-centered education and learn to be effective managers, coaches, and facilitators.

- REAL's community connections provide educational resources, a context for learning, and access to economic opportunities. Community partners are essential to REAL programs, and the community has a direct interest in the success of local business ideas.

YouthBuild Rockford: Rockford, Illinois

YouthBuild Rockford provides unemployed young people between the ages of 16 and 24 with opportunities to acquire construction skills, learn essential workplace skills, complete a high school education (usually through earning a GED), and receive leadership training while they rehabilitate or construct housing for low-income and homeless people. The program emphasizes a broad range of SCANS skills, which are spread throughout the curriculum.

YouthBuild Rockford places a special emphasis on leadership development—in the classroom, in the community, and at the construction work site. Training takes place in the classroom and in the workplace. Through competency-based training strategies, including project-based and work-based learning, students acquire and improve generic competencies, as well as the skills necessary in a high-performance workplace organization, such as teamwork, decision-making, problem-solving, and quality improvement. Staff assess the students' learning based on work portfolios, projects, exhibitions or performances, simulations, and written tests. For graduation, students present their portfolios and demonstrate competencies before parents, teachers, employers, and staff.

Key Lessons

YouthBuild Rockford provides important lessons about effective instructional strategies for develop essential workplace skills among a high-risk population with low educational and skill levels.

- At YouthBuild Rockford, opportunities to serve real community needs provide out-of-school youth with a strong motivation to learn. These learning environments use a broad range of workplace competencies.

- With effective instructional strategies, YouthBuild Rockford helps out-of-school, at-risk youth with low educational and skill levels develop essential workplace skills. Service learning, project-based learning, work-based learning, and leadership development are the primary vehicles for teaching these skills. Teaching and learning integrate: instruction in relevant competencies, opportunities to practice skills in a learning environment, opportunities to use skills to perform meaningful tasks and projects, and ongoing assessment, feedback, and reflection.

- Learning standards help YouthBuild Rockford play an important role in helping young people develop workplace competencies. The curriculum takes into account the SCANS competencies, program standards developed by YouthBuild USA, best practices from youth development programs, and local experience. The program is in the process of aligning the curriculum with the Illinois State Learning Standards, which correlate well with standards for essential workplace skills identified in the SCANS report.

- YouthBuild Rockford benefits from a blend of local experience with models and supports it gains through membership in national networks. Its core program is the model promoted and supported by YouthBuild USA, a national youth and community development organization. YouthBuild Rockford's service learning component is enhanced through participation in AmeriCorps, which engage young adults in community-based service.

Effective Practices for Teaching

Essential Workplace Skills

Case Studies

Work-Based Learning in Boston, Massachusetts

Horizonte Instruction and Training Center, Salt Lake City, Utah

Long Beach City College, Long Beach, California

North Clackamas School District, North Clackamas, Oregon

REAL Enterprises, Durham, North Carolina

YouthBuild Rockford, Rockford, Illinois

Case Study:

Work-Based Learning in Boston, Massachusetts

For her internship at the Roxbury Multi-Service Center, Sharon drafted outlines and designed written exercises and flyers for workshops and other education programs. For these workplace tasks, she consulted with agencies about requests for educational services, attended workshop recruitment meetings, promoted programs through site visits and other outreach activities, and worked with team members and other colleagues at the center to organize education events. At times, the center gave her particularly challenging tasks. For example, she developed new ways to present sensitive information, such as rape-awareness information, to the public, and specifically to teens. Based on her performance, the center promoted Sharon to the position of team leader.

Work-based learning experiences vary in the number and complexity of the tasks students perform, as well as in the required essential workplace skills, ranging from a few foundation skills to a broad range of high-performance competencies. In her Roxbury Multi-Service Center internship, this Boston high school student had to perform complex writing tasks and read a variety of materials, perform several simultaneous multi-step tasks, help identify alternative ways to complete assignments, and both identify and address problems that arose in routine work assignments. She also used a computer for word processing and data entry, handled client and customer questions and service requests, and prepared and conveyed ideas and information to coworkers and the center's clients.

This internship is part of Boston's work-based learning *system*, which has grown in size and improved in quality over time. For more than a decade, Boston has been creating, implementing, and improving strategies for transforming the workplace into a place of learning as well as work.

Critical to this growth and development has been a longstanding partnership among the Boston Public Schools, employers, and higher education. Organized and convened by the Boston Private Industry Council (PIC), the partnership's emphasis has evolved:

- From its beginnings as a youth jobs program to an increasing focus on the learning part of work-based learning;
- From a focus on occupation-specific skills toward greater emphasis on transferable career competencies; and
- From small programs into a system that plays an important role in high school reform.

High-level stakeholder participation and a strong infrastructure have been critical to sustaining, expanding, and improving the work-based learning system, with mutual accountability to improve the quality of learning in the workplace. A key role in this process has been ongoing employer involvement in identifying the competencies that students need and in creating an individualized work-based learning plan to assess how well students learn those competencies. Organized by the PIC, this employer involvement helps ensure that students' workplace experiences are productive for employers *and* valuable learning experiences for young people.

Key Lessons

Boston's work-based learning system provides important lessons about 1) effective practices for teaching essential workplace skills; and 2) systems and structures to implement effective work-based learning on a large scale while maintaining quality.

- Employer involvement, organized in Boston by the PIC and statewide by the Department of Education, was critical in designing Boston's work-based learning system and the Massachusetts Work-Based Learning Plan.

- The Massachusetts Work-Based Learning Plan is an effective organizational and assessment tool because it emphasizes broad, transferable competencies, accompanied by a developmental rubric to assess levels of competencies.

- The user-friendly format of the Massachusetts Work-Based Learning Plan facilitates widespread adoption.

- Boston's internship coordinators are essential to maintaining and improving the quality and quantity of work-based learning experiences.

Building a Work-Based Learning System

Boston's work-based learning system has two strands: the ProTech school-to-career program, which has its roots in a small youth apprenticeship program begun by the PIC in the early 1990s, and the Jobs Collaborative, which grows directly from the PIC's original private-sector summer jobs program in the early 1980s. While both programs emphasize work and learning, ProTech is more intensive and emphasizes workplace learning; the Jobs Collaborative places more emphasis on job readiness and placement.

ProTech is an intensive, multi-year, school-to-career program for juniors and seniors that integrates classroom and work-based learning. It is operated in partnership with five Boston public high schools and employers in four broad career areas: healthcare, business services, financial services, and utilities and communication. ProTech clusters students in career pathways, small learning communities that provide a context for both academic and career-related learning. ProTech students, who must meet certain academic and attendance requirements to qualify for work placements, participate in a variety of structured work-based learning experiences during the school year and the summer, including a full-time job the summer after they graduate. ProTech students maintain a connection with a single employer for a year-and-a half or more. They receive mentoring, tutoring, and career development and college counseling; after they graduate from high school, they receive college and career advising and placement services. At each participating high school, a PIC staff-member—the ProTech Coordinator—is directly responsible for program implementation.

The Jobs Collaborative serves two purposes: students receive job-readiness training and individual job-placement assistance, and employers benefit from pre-screened candidates for part-time and summer positions. PIC Career Specialists, located in each of Boston's public high schools, provide job-placement assistance to any student who meets basic eligibility requirements. Career Specialists also monitor student work placements, provide follow-up services to students, and assist employers by serving as liaisons to the student-employees. The Jobs Collaborative is much larger than ProTech; however, it is less intensive and less structured. Many placements lack any formal integration of work-based and classroom learning.

Systems and Structures: Creating an Infrastructure

Boston's work-based learning system is the result of a conscious, long-term effort to build an infrastructure that supports the expansion and improvement of work-based learning. This system includes:

- A well-organized partnership of schools, employers, higher education, and public officials, led by *a high-level, stakeholder leadership body* that oversees, evaluates, and improves work-based learning;
- An effective *intermediary organization*, with adequate funding and staffing, that convenes and coordinates the partnership for reform and makes connections among students, schools, and employers;
- Systems to *document the impact* of work-based learning on student outcomes and its value to employers as well as students; and
- Agreement around the *competencies that are essential for success* in the workplace and ways to assess the quality of workplace learning experiences and student performance.

The Stakeholder Leadership Group

The School-to-Career Steering Committee brings together top-level representatives of key Boston employers, individual schools, the school district, community partners, and the PIC. The committee sets the overall direction and goals for school-to-career and work-based learning, develops implementation strategies, measures progress in implementation, and assesses the impact on students.

The Intermediary

The Boston PIC is the governance and policy-making body for Boston's workforce development system, as well as the organizer and convenor of the School-to-Career Steering Committee and the Boston Compact (the city's collaborative school improvement agreement). As an intermediary, the PIC builds, strengthens, and sustains connections between schools and employers.

Work-based learning as it exists today in Boston would not be possible without the PIC staff in each high school. Over 50 PIC staff—including 38 based in the schools—work with employers, schools, and Boston youth to broker work-based learning opportunities for students, high school graduates, and out-of-school youth. These staff play a critical role in Boston's work-based learning system: they prepare youth for the workplace, train employers to work with and supervise young people, serve as the bridge between employers and school personnel, match students with employers, monitor each placement, and address problems that arise.

The Boston Public Schools and the Commonwealth of Massachusetts provide ongoing funding to support the PIC's connecting activities infrastructure. The school district supports the Career Specialists who have responsibility for student case management and maintaining connections among schools, employers, and students. The Massachusetts School-to-Work Connecting Activities Act allocates funds to local intermediary organizations based on the number of paid, structured, work-based learning experiences they generate.

Documenting Progress

Documenting progress—both of the implementation of work-based learning and of its impact on students and employers—has been critical for building sustained public support and forward momentum in Boston. Based on goals set by the evaluation subcommittee of the Steering Committee, a benchmarking process provides evidence that workplace learning is expanding in scale, improving in quality, and making a difference for young people and employers.

On the student side, the benchmarking process has shown that intensive school-to-career experiences have increased the numbers of students graduating from high school, going to college, staying in college, and earning a degree. Moreover, school-to-career appears to improve young people's high school attendance, discipline in school, classroom grades in academic courses, and scores on reading and math tests.

Work-based learning also benefits employers—a critical factor in sustaining and growing the program. Employers have indicated that working with students helps their firms address workforce development needs while also fulfilling civic responsibilities.[10] Over 80 percent of workplace supervisors surveyed rated their students as similar or superior to typical hires on a variety of skills, such as productivity and job-related math and communication skills; 83 percent reported that student productivity benefited their firms; two-thirds viewed student placements as a way to develop a pool of qualified entry-level employees. Employers involved with intensive work-based learning repeatedly pointed to better entry-level workers as the key reason behind their continued participation, and many Boston employers consider work-based learning critical to ensuring a well-qualified workforce in the future.

Competencies for Success: The Work-Based Learning Plan

The School-to-Career Steering Committee has recognized the importance of essential workplace skills for both improving economic opportunities for young people and ensuring a well-qualified workforce. As a result, it placed strong emphasis on developing a set of competencies to describe what students need to know and be able to do to succeed in the workplace. Over several years, a set of school-to-career competencies emerged, and they were central to the state's designation of competencies, which Boston has now adopted as well (see chart). Stakeholder agreement on this core set of transferable competencies has provided a foundation for maintaining, expanding, and improving work-based learning.

The Nine Massachusetts Competencies

The Massachusetts Department of Education has designated nine broad-based, transferable competencies that students need to know and be able to do. Several of these competencies correlate closely with SCANS foundation skills and workplace competencies, specifically communication and literacy, organizing and analyzing information, problem solving, using technology, completing entire activities, acting professionally, and interacting with others.

---

[10] *Jobs for the Future/Private Industry Council Benchmark Communities Initiative Supervisor Survey.* Boston Private Industry Council, Boston Public Schools School-to-Career Office, and Jobs for the Future. June 1998.

I. Individual

1. *Communication and Literacy:* Speaking, Listening, Reading, Writing

2. *Organizing and Analyzing Information:* Collecting and Organizing Information, Research and Analysis, Quantitative Analysis and Mathematics

3. *Problem Solving:* Identifying Problems, Solving Problems

4. *Using Technology:* Using Work Tools and Office Equipment, Computer Operation

5. *Completing Entire Activities:* Initiating and Completing Projects, Time Management

II. Team

6. *Acting Professionally:* Attendance and Appearance, Accepting Direction and Criticism, Flexibility and Maintaining Self-Control, Respecting Confidentiality

7. *Interacting with Others:* Interacting with Customers/Clients, Interacting with Co-Workers, Managing Stress and Conflict, Respecting Diversity

8. *Understanding All Aspects of the Industry:* Understanding the Structure and Dynamics of the Entire Organization, Recognizing Health and Safety Issues, Understanding Personnel Policy and the Labor/Management Relationship

III. Personal and Professional Development

9. *Taking Responsibility for Career and Life Choices:* Teaching and Learning on an Ongoing Basis; Balancing Personal, Professional, and Academic Responsibilities; Setting Career Goals

The participatory process of developing this set of competencies has built and sustained employer investment in and support for work-based learning, and it has provided a clear focus for mutual accountability among schools, employers, and the PIC. The competencies have also been key to the creation of a work-based learning plan, first in Boston and now statewide. The Massachusetts Work-Based Learning Plan is a tool that makes the competencies the central focus for student learning in the workplace. It offer a framework for improving the quality of workplace learning opportunities by providing explicit learning goals and performance standards. The plan:

- Ensures that work placements are both productive for employers and valuable learning experiences for students;

- Focuses workplace experiences on opportunities to learn the essential career competencies developed by the school-to-career partnership;

- Establishes clarity around expectations for supervisors and work-based mentors, students' job responsibilities, and expectations for students' work performance;
- Focuses everyone involved in work placements on the learning potential of the workplace and the explicit competencies embedded in the job description.

Evolution of the Work-Based Learning Plan

The work-based learning plan was developed gradually and collaboratively. It has evolved from an original focus on occupation-specific skills to emphasize broad transferable competencies. Further, it has become easier for employers to use and, to guide assessment, explicit performance standards have been added for each competency.

The PIC's first learning plan, the 1992 ProTech Training Plan, specified occupational tasks, desired qualities or knowledge, and behavioral expectations. It focused on detailed job-specific tasks associated with entry-level positions at participating employers; PIC staff developed the task lists in close collaboration with employer representatives from each industry. Training plans also addressed such issues as ethics, behavior, professionalism, and teamwork, with a full page for the employer, student, and ProTech Coordinator to specify individual training goals.

ProTech employers felt a significant sense of ownership of the Training Plan because of the participatory design process, yet the PIC and its employer and school partners also began to see limitations in the plan's emphasis on occupationally specific tasks.[11] The 1996 School-to-Career Learning Plan shifted toward 11 broad-based, transferable competencies agreed upon by stakeholders. The specific competencies would change slightly over time and, with the incorporation of elements from other plans used in the state, lead to the nine competencies in the Massachusetts Work-Based Learning Plan, which reflect broad agreement about what young people need to know and be able to do.[12] A significant recent addition is a developmental rubric that articulates clear criteria for low, medium, and high performance in relation to each competency, as well as in relation to elements that further describe each competency.

Through the competencies and the developmental rubric, the designers of the Boston and Massachusetts Work-Based Learning Plans have sought to set standards, expectations, and assessment criteria for both entry-level and high-performance workplace skills. The basic competencies are reflected at the "Needs Development" and "Competent" levels. These are important for virtually all students, most of whom have little or no work experience. For the most part, the developmental rubric incorporates standards and criteria for high-performance skills at the "Proficient" or "Advanced" levels. Finally, the work-based learning plan intentionally goes beyond the scope of SCANS or workplace-specific competencies, reaching into youth development with two competencies in particular—Acting Professionally and Taking Responsibility for Career and Life Choices. The table below shows how the design of the work-based learning plan, particularly its developmental rubric, addresses both entry-level and high-performance skills:

---

[11] According to Keith Westrich, a former ProTech staffer, "Not only was the Training Plan trapping students into particular occupational categories, but the categories also would change constantly." Westrich now works at the state Department of Education, where he directs use of the Massachusetts Work-Based Learning Plan.

[12] In his role at the state Department of Education, Westrich convened employers, educators, and school-to-career practitioners to form a statewide design team to develop these competencies.

Massachusetts Work-Based Learning Plan:

Selected Examples from the Developmental Rubric

Example	Needs Development	Competent	Proficient	Advanced
Reading *(from Competency 1: Communication and Literacy)*	Interprets written directions and workplace documents with assistance	Reads written directions and workplace documents independently	Reads written materials, including technical documents independently; asks questions where appropriate	Reads complex written materials and executes related tasks independently
Identifying Problems *(from Competency 3: Problem Solving)*	Identifies problems with help from supervisor	Identifies problems independently	Explores causes of problems and evaluates impact on various stakeholders	Identifies potential problems and proposes preventive action.
Solving Problems *(from Competency 3: Problem Solving)*	Solves problems with help from supervisor	Solves simple problems independently	Explores options and considers several alternative solutions when solving problems	Develops hypotheses and proposes creative solutions and systemic change, including preventive action
Computer Operation *(from Competency 4: Using Technology)*	Learning basic computer skills	Uses appropriate software to complete assignments	Uses appropriate software to complete assignments	Applies appropriate software innovatively to improve organization's productivity
Time Management *(from Competency 5: Completing Entire Activities)*	Meets assigned deadlines with supervision	Sets priorities and deadlines independently	Sets priorities and deadlines independently	Manages multiple tasks and projects effectively

Accepting Direction and Criticism *(from Competency 6: Acting Professionally)*	Learning to accept direction	Accepts constructive criticism with positive attitude	Accepts constructive criticism with positive attitude	Accepts and applies constructive criticism to improve performance
Interacting with Co-workers *(from Competency 7: Interacting with Others)*	Developing basic interaction skills; responds when others initiate conversation	Participates constructively as part of a team	Participates constructively as part of a team	Leads teams of co-workers to complete projects timely and effectively

Using the Plan to Improve the Quality of Workplace Learning

Virtually all high school and postsecondary students work, but opportunities to learn on the job are few and far between, often limited to job-specific skills that a person can learn very quickly. By placing a clear focus on what and how students learn in the workplace, the Massachusetts Work-Based Learning Plan goes to the heart of the difference between work-based learning and an after-school or summer job.

The plan can improve the quality of work-based learning by creating a focus for the employer and students to:

- Develop a clear job description and identify the key tasks or projects the student will perform;
- Identify the three to five competencies most critical to the student's tasks or projects, along with the level of complexity and difficulty required;
- Assess student proficiency in job-related competencies soon after the student begins the placement;
- Use the initial assessment to collaboratively develop learning goals in agreed-upon competency areas;
- Identify how the student can move to higher levels of performance in relation to particular competencies and identify tasks and projects within the job description that provide opportunities to learn essential workplace skills;
- Conduct assessments at the end of the job or at appropriate intervals to identify which goals the student has met and which require more attention.

The 1998 survey of Boston employers confirms that work-based learning plans enhance internship quality.[13] The survey found that Boston's work-based learning plan greatly increased the chance that employers would formally evaluate the students: 79 percent of students with plans were formally evaluated by their supervisors compared with 37 percent for those without plans. Employers who offered higher-end work placements tended to be in more frequent contact with PIC staff and more likely to formally evaluate their student employees. These findings suggest that a learning plan, its use as an evaluation tool, and the regular interaction that accompanies its use all positively correlate with placements requiring students to develop and exercise higher-order skills.

Building Mutual Accountability

The work-based learning plan fosters accountability, which employers and PIC staff have both welcomed. Employers understand that PIC staff are responsible for monitoring each placement and checking with employers to ensure that evaluations, using the plan's rubric, are completed. Likewise, managers at Boston firms that employ a large number of students (and that pair many front-line supervisors with the students) see the PIC's monitoring role as essential in reminding those supervisors to assess student performance carefully and in a timely fashion. The plan provides an understood, non-threatening way for the PIC's ProTech Coordinators and Career Specialists to initiate discussions about the quality and progress of a work-placement.

With this type of accountability, the plan helps frame interactions among all the parties around what the student is capable of, how his or her unique talents can help the employer, and how he or she can improve skills in particular areas. Few students receive this kind of focused attention from adults at school or at other jobs.[14]

Staff Development and Support

Staff support from the PIC and training for work-based supervisors have proven critical in using learning plans to drive quality in work-based learning. In Boston, ProTech Coordinators and Jobs Collaborative Career Specialists are deeply involved in that process as they work with employers to relate job descriptions to specific competencies, mentor and guide students, monitor the placements, and participate in evaluation meetings. Assistance from PIC staff is especially valuable when an employer first uses the plan.

To address issues that arise in managing young workers, PIC staff conduct workshops for supervisors, using the work-based learning plan as their organizing focus. In small groups, the participants use the work-based learning plan to articulate competencies, goals, and tasks in the context of a project with which everyone would be familiar—for example, planning a party. This gives the supervisors a concrete sense of how the tool can be used and raises key supervisory issues within a context that makes its more meaningful.

Designing High-Quality Workplace Learning Experiences

The number, complexity, and difficulty of the tasks students perform in the workplace have a major impact on the job's potential to be a learning experience. The need is ongoing to improve the quality of workplace learning placements by expanding the number of high-end placements in which students perform challenging, complex tasks that require a range of competencies at a high level of proficiency.

---

[13] *Jobs for the Future/Private Industry Council Benchmark Communities Initiative Supervisor Survey.* Boston Private Industry Council, Boston Public Schools School-to-Career Office, and Jobs for the Future. June, 1998.

[14] "The plan gives an opportunity for the employer, the supervisor, the PIC coordinator to talk to students specifically about themselves," says Lillian Saey of the Federal Reserve Bank of Boston.

While school-to-career workplace placements offer better learning opportunities than traditional youth jobs, a key to improving the quality of work-based learning is the creation of intensive placements with high-end potential. In the 1998 survey, about one-fourth of students were in high-end placements that required them to use a number of competencies at a high level of complexity and skill.[15] The number and skill level of competencies students had an opportunity to use were related to 1) the tasks and projects incorporated in the job description, and 2) the organization of the workplace learning experience.

Placements that incorporate competencies at the Proficient or Advanced level are beginning to provide models for designing internships in which students can learn high-performance workplace skills. Sometimes this happens because a student maintains a longer connection with an employer and can prove his or her ability over time. At other times—at the Roxbury Multi-Service Center, for example—the employer has a real need for students to assume more responsibilities, exercise judgment, and work in teams. And some employers are simply more interested in teaching and staff development.[16]

The Future: Increasing Scale/Maintaining and Improving Quality

Next Steps in Boston

The work-based learning plan is used widely in Boston. ProTech employers must use it, while Jobs Collaborative employers use it to an ever-increasing degree. The PIC also integrates the plan to varying extents into all its school-to-career programs—career academies, alternative education programs, and even middle school service-learning opportunities.

Still, there is potential for improvement. During the July 1998-June 1999 program year, work-based learning plans structured the workplace experience of about one-fourth of the students in PIC programs; a similar percentage of students completed a plan during the summer of 1999.

Just as important, school-to-career is undergoing a transition in Boston as part of a district high school restructuring plan. Until recently, school-to-career and work-based learning have offered opportunities for some students; now Boston has begun a process of whole school change, reorganizing its high schools into small learning communities, such as career pathways. This is giving rise to a challenge and an opportunity: the need to increase the number of work-based learning experiences while preserving the quality provided by smaller programs.

---

[15] The results varied by industry group—for example, 56 percent of social service placements were high-end compared to 11 percent of retail placements—and by the particular competency—42 percent performed Client/Customer Service at a high level of complexity and difficulty while Planning and Decision Making was not a responsibility of the job for 44 percent of the placements.

[16] At the City of Boston Election Department, students developed, edited, designed, and published a compilation of their learnings and reflections on their summer work experience. The workplace supervisor, Maureen Cox, had suggested the project, recognizing that the group effort would tap into additional competencies and make the work experience more meaningful.

School-based PIC staff increasingly are coming up against the quantity-versus-quality dilemma. Each of these staff have annual goals to meet for numbers of completed plans, a challenge that probably affects Jobs Collaborative Career Specialists more because they develop and monitor so many job placements. And for both ProTech and Collaborative staff, time pressures are particularly intense in the summer, with more worksites and only eight to ten weeks to develop a plan and use it meaningfully.

As a result, the PIC is in the midst of efforts to improve implementation of the work-based learning plan by:

- *Working with supervisors to incorporate higher-order skills:* Learning plans and work placements tend to emphasize entry-level workplace competencies for several reasons, including students' youth and inexperience in the workplace, employers' particular needs, and the temporary or part-time nature of student jobs. As employers grow more comfortable with student workers, the potential exists for PIC staff to help employers expand job descriptions so that students work on more complex projects and additional competencies.

- *Encouraging employers to delve more deeply into learning plans:* The learning plan provides an opportunity for employers to assist students with the process of setting individualized goals and to provide the young people with specific commentary on performance. This potential has been underutilized for a variety of reasons, including limited time, competing considerations, and the fact that employers may not ordinarily engage in such processes with regular, full-time employees.

Next Steps in Massachusetts

The Massachusetts Work-Based Learning Plan now helps structure internships or connect classroom learning with work-based learning experiences for more than 10,000 youth across the state. The Massachusetts Department of Education has launched a process to drive quality in work-based learning by expanding the use of the plan further. Major aspects of this process include:

- *Creating Regional Training Teams:* Through outreach and workshops, the Department of Education is developing and certifying Regional Training Teams of local school-to-career practitioners. These teams will train educators, employers, students, and parents in delivering quality work-based learning, with particular emphasis on implementing the Massachusetts Work-Based Learning Plan. These teams will be responsible for providing local training on work-based learning strategies and tools.

- *Disseminating the Work-Based Learning Toolkit:* In connection with work-based learning and the learning plan, the Department of Education has developed a set of materials for use by the Regional Training Teams, employers, and educators. The toolkit has five modules: Training Essentials, Implementing the Massachusetts Work-Based Learning Plan, Mentoring and Supervising Teenagers, Workplace Safety, and Connecting the Workplace Competencies with the Learning Standards. It also contains a video capturing quality work-based learning experiences, as well as overhead slides, handouts, and a CD-ROM.

- *Conducting research and collect data to document skill gains and the impact of best practices:* The Department of Education is working with Boston and four other communities to study student skill gains in work-based learning placements using the learning plan. The pilot study of 500 students, conducted in the summer of 1999, is almost complete. One early finding appears to be that skill gains were higher for students whose plans included individualized learning goals. Also underway is a full-year, statewide study. Covering all 10,000 students currently using the learning plan, the study will examine skill gains over a longer period and in places where multiple reviews use it.

Lessons Learned

In Boston and Massachusetts, work-based learning plans have proven to be an effective tool for structuring work-based learning placements and promoting the development of workplace skills. The Boston Private Industry Council and its role in Boston's work-based learning system provide important lessons about 1) effective practices for teaching essential workplace skills in the workplace; and 2) systems and structures to implement effective work-based learning on a large scale while maintaining quality.

- *Employer involvement, organized in Boston by the PIC and statewide by the Department of Education, was critical in designing Boston's work-based learning system and the Massachusetts Work-Based Learning Plan.* From the start, employers have been partners in developing and refining Boston's learning plan. Although the PIC and later the state Department of Education managed the process of creating today's Massachusetts Work-Based Learning Plan and were ultimately responsible for producing it, employers drove many of the decisions about content and provided extensive input on design. Largely as a result, the same employers now champion the plan, and it has credibility among employers.

- *The Massachusetts Work-Based Learning Plan is an effective organizational and assessment tool because it emphasizes broad, transferable competencies, accompanied by a developmental rubric to assess levels of competencies.* By addressing core competencies, the plan relates to all workplaces and to preparation for life in general. The developmental rubric takes the plan's broadly defined skills and makes them concrete and provides the structure for a more objective evaluation of workplace performance.

- *The user-friendly format of the Massachusetts Work-Based Learning Plan facilitates widespread adoption.* Many features of the plan encourage more employers to adopt it. Most employers have welcomed the plan's streamlined format and ease of use. It has clear directions and check-boxes, saving time. It is also designed to enable employers to focus on a subset of competency areas and address them with students in more depth.

- *Boston's internship coordinators are essential to maintaining and raising the quality and quantity of workplace learning experiences.* The PIC's "connecting activities" staff are essential to implementing the program and assuring its quality for several reasons. First, many employers do not regularly or in a structured way evaluate the performance of regular employees, let alone students. Second, the learning plan's simplicity carries a potential risk: filling it out can become a *pro forma* exercise. The preparation of a plan does not in and of itself mean that discussions about expectations will take place or that the plan will have a genuine impact on the quality of the internship. PIC staff introduce employers and students to the learning plan, facilitate discussions around goals, help to interpret and apply the plan, and monitor the overall progress and quality of work-based experiences.

Contact Information:

Neil Sullivan, Executive Director
Mark Cafferty, ProTech Director
Scott Brown, Manager, Jobs Collaborative
Jennifer Power, Evaluation Coordinator
Boston Private Industry Council
Two Oliver Street
Boston, MA 02109
Phone: (617)423-3755
Fax: (617)423-1041
neils@bostonpic.org
www.bostonpic.org

Keith Westrich
Massachusetts Office for School to Career Transition
Massachusetts Department of Education
350 Main Street
Malden, MA 02148
Phone: (781)388-3300
Fax: (781)388-3382
info-stw@doe.mass.edu
www.doe.mass.edu/stw

Case Study:
Horizonte Instruction and Training Center

"I have seen my daughter go from F's to A's in less than a year. She actually looks forward to school again as a place where there is kindness and respect. You have given her back the confidence every teenager needs to get through life."—A parent

U.S. Secretary of Health and Human Services Donna Shalala has called Horizonte Instruction and Training Center in Salt Lake City, Utah, a model of what schools should be. If so, the traditional high school must change in almost every imaginable way:

- A traditional high school offers an academic program that meets district and state requirements for high school graduation. Horizonte is a one-stop center linking an alternative high school with a range of adult education and workforce development programs. Students can earn a high school diploma, a Graduate Equivalency Diploma (GED), as well as engage in vocational training, work-based learning, and English as a Second Language (ESL) courses of study.

- A traditional high school usually offers its program in a single building, on its own campus, isolated from the community. Horizonte is a community-wide effort to educate youth and adults. In addition to the main site, students learn at 25 Salt Lake City satellite locations, ranging from a community college to public housing, community centers, and a jail. At the main campus, day care is provided. Horizonte also helps students learn outside of the classroom through cooperative partnerships with 50 public, private, and non-profit agencies.

- A traditional high school serves young people, using public education funds. Horizonte is run by the Salt Lake City School District, yet it combines a variety of public and private funding streams to serve both youth and adults: 1,800 high school students, most of whom had not succeeded in traditional schools, as well as 180 young parents, 3,600 ESL students, and 4,500 adults seeking high school completion, a GED, or Adult Basic Education.

- In traditional high schools, the emphasis is on imparting the academic content and skills specified for high school graduation and, for those students in the college track, the content and skills required for college entry. Horizonte has a deep commitment to helping all of its students learn the academic foundation skills (reading, writing, math) and the cross-cutting, SCANS-type competencies (ability to seek out, organize, and use information, ability to use technology appropriately, etc.) that are the "gatekeepers" to economic opportunity. This means that Horizonte teachers and staff see themselves as facilitators and coaches whose job is to create rich learning experiences for students who are active learners engaged in work that is important to them.

- In a traditional high school students are expected to adapt to the school's organization, structure and curriculum. The assumption is that one size fits all. Horizonte puts students first, adapting to each person's needs and learning style. With a 12-month schedule, students come and go throughout the year; many leave and come back, earning and building on credits for work completed.

- In a traditional high school most learning takes place in self-contained classrooms; teachers and textbooks are the typical sources of information. At Horizonte, learning extends to school-based enterprises and projects in the community, where students learn by addressing real-world issues and problems. Students learn from other adults in addition to their teachers.

Key Lessons

In moving away from a narrow academic focus and traditional teaching Horizonte incorporates a number of effective practices for teaching essential workplace skills and improving academic achievement for its students:

- Horizonte's deep commitment to helping students learn the skills necessary to become productive and economically self-sufficient provides a strong foundation for teaching and learning essential workplace skills. Its explicit emphasis on specific SCANS skills, such as reading, writing, math, and technology, provides a clear, school-wide focus for teachers and students.

- Horizonte's student-centered values are critical to the teaching of foundation skills and workplace competencies. The program builds on each student's individual experiences and strengths, shaping the curriculum to meet student needs and learning styles. When a student struggles, academically or socially, it means the school has yet to create conditions in which he or she can flourish.

- Horizonte's non-traditional structures—such as community-based locations, a year-round, extended-day schedule, and the linkage of adult education programs with a high school—make it possible to serve a broad range of youth and adults who have previously not been successful in school and to build strong community partnerships that help create productive learning environments for these students.

Horizonte Works

The evidence is clear: Horizonte enables the high school youth in its student body to succeed academically and develop skills they need to become self-sufficient, contributing participants in their communities. Although traditionally considered high-risk,[1] 85 percent of Horizonte's adolescent population tested passed the Salt Lake City School District writing competency test in 1995-96, and Horizonte students have outperformed the district as a whole since then. That same year, youth with ethnic-minority and low-income backgrounds who had been at the school for at least one year achieved the greatest gains on the Scholastic Assessment Test among the district's secondary schools. Horizonte students enrolled in the federal Job Training Partnership Act program in the summer of 1996 averaged two year's growth in mathematics and reading. Moreover, there is preliminary evidence that the Horizonte approach also pays dividends for the school's adult populations. Adult students who remained at Horizonte throughout the 1998-99 school year (a small subset of all adult students) showed substantial gains in reading and math, as measured by the Test of Adult Basic Education (TABE).[2]

Horizonte attributes its success, which spans its diverse program types and populations, in large measure to teaching strategies and an environment that enable students to learn, practice, and strengthen a range of foundation skills and workplace competencies:

- Across the curriculum, the focus is on reading, writing, and math.

---

[1] Nearly 70 percent of high school youth at Horizonte are ethnic minorities; more than 80 percent of all Horizonte students live in poverty; 58 percent live in single-parent households.

[2] Horizonte's open entry/open exit policy means that relatively few students from any of the school's populations remain enrolled throughout the school year. During the 1999-2000 school year, Horizonte began post-testing students on the TABE every 12 weeks in an effort to calculate difference scores for a larger percentage of students.

- Every course includes the expectation that students will become highly proficient in technology. Technology is pervasive at Horizonte, with high standards and expectations: teachers require students to use the Internet to conduct intensive research and computer-based presentation software to present what they have learned.

- In experiential, project-based service learning, school-based enterprises, and hands-on occupational programs, students learn and apply essential workplace skills by doing activities that are important to them and to the community.

- Personalized advisory groups provide structured opportunities for students to develop individualized learning plans and learn and practice essential workplace skills.

- Teachers make a deep commitment to helping students learn the skills necessary to become productive, economically self-sufficient adults, recognizing that those skills are a gatekeeper to economic opportunity.

Students Come First: Bringing a Mission to Life

The Horizonte Mission Statement

"Valuing the diversity and individual worth of students, Horizonte Instruction and Training Center, a multi-cultural learning center, will provide the education and skills necessary for students to achieve self-sufficiency and become contributing participants within their communities."

Horizonte's success in teaching foundation skills and workplace competencies is based on more than specific instructional practices; it also derives from the ability to bring student-centered values and principles to life. Decisions about what will be taught and how, about how students are treated, and about how the school is organized are driven by their affect on the school's ability to help each individual student succeed.

This mission is reflected in five guiding principles:

- The curriculum is shaped to meet student needs and learning styles. The school addresses all state standards but with methods as diverse as the students and teachers themselves.

- Access to technology is a vital need for everyone.

- Horizonte is an inclusive multi-cultural learning community. The curriculum reflects a wealth of cultural perspectives.

- Horizonte helps all students reach their full potential.

- Horizonte teachers are enthusiastic, adaptable, lifelong learners.

Most learners come to Horizonte after a lack of success in regular school settings. Horizonte sees its task as providing a supportive environment that both motivates them and allows them to recognize windows of opportunity and reach their educational and career goals. There is a deep understanding that students will live up, or down, to the expectations that schools hold for them and that they hold for themselves—that little will happen until students believe they can learn and until they are motivated to learn.

Horizonte's staff works hard to show that it believes in learners who no longer believe in themselves. *Horizonte* is Spanish for horizon, highlighting the school's belief in the potential of each student as stated in the school motto: *As far as the Eye can see... As far as the Mind can reach.* While Horizonte recognizes that its learners may face many challenges—poverty, discrimination, teenage pregnancy, disrupted childhoods—it sends a consistent message that these are challenges to overcome, not excuses. When a student struggles, whether academically or socially, this is not viewed as a failure of the student but an indication that school personnel have yet to create conditions that permit him or her to flourish.

Horizonte adapts to accommodate student needs instead of expecting students to adapt to the school. The emphasis on personalized learning is evident in the large number of satellite programs—in various settings and with a range of teaching practices—and in the year-round, day-and-evening schedule. Similarly, an emphasis on hands-on, experiential approaches to learning derives from the understanding that Horizonte students learn in ways not often rewarded in traditional schools. A focus on creating opportunities for students to learn by doing something important to them recognizes that many students usually see little reason for what they are expected to learn in school.

Project-Based Learning: Service Learning and Occupational Programs

Service learning and hands-on occupational programs are cornerstones of the Horizonte curriculum. In service learning, students identify ways to help others in need—weatherizing the homes of elderly women living alone, for example. School-based enterprises provide opportunities for students to do real work, such as renovating low-income housing. Service learning and occupational programs provide a strong foundation for project-based learning: more than grades are at stake as students do real work that is important to them and that requires them to use both academic learning and essential workplace skills.

Service Learning

Initially, Horizonte offered community service as a "reward" students could earn. The learning goals of these experiences were not explicit. It later moved toward a more rigorous model of community-based service that provides a context for academic learning for all students. In 1996, Horizonte elevated service learning to the status of a school-wide goal and began requiring faculty to use it as a teaching technique. Today, service learning is a strategy to enhance the academic curriculum and help provide students with the skills, values, and attitudes necessary to become contributing members of their communities.

Horizonte teachers were initially unprepared to take the important step from community *service* to service *learning*, however, and staff development became a key to progress. In 1997, a student from the University of Utah's Lowell Bennion Community Service Center began to train teachers in service learning techniques and help them plan and implement service learning projects; a Bennion graduate then helped Horizonte establish a comprehensive service learning program. In the 1997-98 school year, over 90 percent of Horizonte teachers and 100 percent of its students participated in at least one service learning experience.

Although projects vary in the complexity of what they challenge students to do, the best among them demonstrate the power and potential of service learning as a vehicle for learning high-performance workplace competencies. Students do a great deal of research and, in many cases, decide on the actual projects. In a project on preventing social problems, a group of Horizonte students drew on their own experiences in developing a way to help fourth graders. The Horizonte students began by identifying when they themselves started having problems at school, then identified the specific social and citizenship skills they lacked that made it difficult to remain in school, stay out of trouble, and be productive. The specific project grew out of their supposition that many fourth graders today lack the same skills. Each Horizonte student selected one skill, developed a lesson and practice activity addressing that skill, and taught the lesson to a fourth grade class.

For a service project on energy waste and conservation, students hypothesized that poor, elderly women living alone needed to conserve energy but did not possess the skills or materials to install energy-saving improvements in their homes. Students discussed problems faced by this "customer base," contacted agencies that provided the names of women needing weatherization services, called the customers to set up an energy audit, and, as teams, conducted audits. After completing the audits, the teams decided what energy-saving devices and strategies would help each customer, bought supplies working within a budget, installed the equipment, and compared the women's energy bills with the previous year's. Finally, the students gave a presentation on their experience at a local public library.

In a third project, adult ESL students improved several skills by making presentations about themselves and their diverse homelands to a ninth grade geography class. The Horizonte students researched their native countries through books, periodicals, and the Internet, then used that research to write speeches they presented to a demanding young audience. By translating "book history" into real people's life experiences, ESL students came away with a sense of what they have to offer for ninth graders who have lived in a homogeneous community all their lives, as well as a better ability to read, write, and make a presentation.

The Characteristics of Service Learning Projects

A well-designed service learning project:

- Provides meaning and motivation for learning by taking students into the community to do something that has real consequence for real people;
- Sets high standards and provides opportunities for students to apply a broad range of workplace competencies;
- Integrates academic content tied to specific curricular objectives; and
- Gives students opportunities to present their work to an authentic audience and culminates in a product that benefits others and can be assessed.

Occupational and Training Projects

In keeping with its mission to prepare people for productive adulthood, Horizonte offers career training that enables students to learn and apply essential workplace skills. The primary objectives are to expose students to career options and help them develop job-specific skills. At the same time, the hands-on, experiential learning nature of instruction lends itself to the development of a broader range of essential workplace skills.

School-based enterprises, in particular, engage Horizonte students in authentic work that has real consequences, serves real clients, and must meet real-world performance standards. Project-based occupational training requires students to use teamwork, interpersonal and communication skills, planning, and problem-solving to perform their work successfully and satisfy clients or customers. These skills and competencies are practiced and developed as:

- Child care students serve youngsters, parents, and staff in an on-site day care center for the children of students and staff;

- Construction trades students restore inner-city homes under an agreement with the Salt Lake City Housing Authority and renovate the district's Applied Technology Education Center;

- Food service students operate the main campus's food service, an on-site restaurant, and a catering service; and

- Horticulture students landscape and maintain school grounds, design a garden, advertise an annual plant sale, and collect and classify data on the plants they grow.

In all these enterprises, students are accountable to more than just themselves, providing a context for developing personal qualities such as responsibility, integrity, self-management, persistence, and commitment to doing quality work.

Infusing Technology in the Curriculum

An expectation that all students will develop strong proficiency in computer-based technology is pervasive. Whether at the main campus, which houses one of Utah's most advanced computer laboratories, or at satellite sites, Horizonte places a high priority on integrating technology, a key SCANS skill, into the curriculum.

This school goal is consistent, explicit, and drives both teacher practice and, by extension, student learning. All classrooms are equipped with computers, all staff *and all students* have e-mail accounts. Each student learns how to send and receive e-mail, use the Internet, and operate fax machines, photocopiers, digital cameras, and scanners. Every student creates two computer-based presentations each year using sophisticated computer-based presentation software. Students create the first presentation on a topic of their choice, but the second one must relate to learning from an academic course.

Computer-technology standards are rigorous and high, given that most students had little academic success before coming to Horizonte. One teacher, for example, has required that student presentations incorporate six pictures downloaded from the Internet, ten pieces of "WordArt," custom animation on at least five slides, and the use of slide transition features, sounds, digital camera, and a scanner.

The combination of relevant topics and the experiential freedom to explore and experiment with computer technology engages students as active learners. In the process, students practice a variety of workplace skills, such as solving problems, communicating creatively using a range of media, and collecting, organizing, evaluating, and presenting information.

At least two elective courses—Foundations of Technology and Principles of Technology—emphasize hands-on learning. Students in these courses have access to a robotic arm, an air compressor, a laser, and computer assisted design (CAD) software, and they make regular use of these tools as an integrated part of the coursework.

Horizonte's problem-based approach to instruction, coupled with this technology focus, helps students simultaneously develop expertise in many high-performance competencies. For example, students have worked in teams to use CAD software in designing a can opener for a person with one arm. This assignment required students to apply skills in problem-solving, teamwork, and creative thinking to perform a complex, challenging task.

Individualized Learning

The goal of the Salt Lake City School District is for all students to be complex thinkers and problem solvers, effective communicators, cooperative group participants and leaders, contributors to the community, quality workers and producers, and self-directed learners. In addition, the state requires every adult education and high school student to develop an annual occupational learning plan—the Student Education Occupation Plan (SEOP)—to develop career goals and make a plan for achieving those goals.

In many traditional high schools, achieving these goals and fulfilling these requirements is largely a formality as each guidance counselor tries to fill out the SEOP forms for 400 to 500 students. Horizonte, too, first treated the plan merely as a bureaucratic requirement. However, the school has worked to transform the SEOP into a living document, recognizing that it can serve to personalize learning and foster closer relationships of teachers to students and parents.

Upon enrolling at Horizonte and at the beginning of every year thereafter, students, in conjunction with parents (when applicable) and school staff, develop one-year goals, an action plan for achieving those goals, and a means for evaluating progress, using the district's SEOP form as a guide. The focus of this process is on helping students acquire the tools they need to become self-sufficient members of the community. Those tools could include a high school diploma for some or language acquisition for others, but the key is finding a way for people to feel good about themselves and perceive their progress toward specific goals.

Today, the district's six overarching learning goals for students are central to the SEOP process at Horizonte, and they align closely to several essential workplace skills—complex thinking and problem solving, communication, teamwork and leadership, contribution to the community, becoming quality workers and producers, and self-directed learning. During a weekly advisory period, teachers often work one-to-one with students, guiding them through completion of an individualized SEOP. Teachers routinely ask newer students what they see as their greatest strength among the six learning goals and help them design a learning plan that takes advantage of those strengths. The school encourages students in their second or third year to construct learning goals and action plans that develop new competencies.

A new advisory curriculum is designed to go even further in helping students learn and practice a broad range of career-related and personal competencies. Several teachers created this new curriculum, which provides structured group activities to help students develop a number of work-related skills: interpersonal and social skills; self-management, decision-making, and communication skills; critical thinking, self-assessment, and personal qualities necessary for workplace success; and career planning. The curriculum was piloted at a Horizonte satellite site last year and is being used across all sites this year.

Personalizing Advice

Horizonte's personalized advisory system is an essential component in a high school experience in which students come first. The advisory process makes workplace competencies explicit and engages students in applying those competencies to develop a concrete learning plan.

One lesson, for example, helps students examine their own study habits, priorities, and goals. It also provides activities in establishing priorities and offers guidance in constructing short-term, medium-term, and long-term goals. Another activity helps students identify their own decision-making style, takes them through five steps of making a well-considered decision, and gives them practice using the five-step method to address several hypothetical dilemmas.

The Future: Making SCANS Skills Explicit

Looking ahead, Horizonte plans to institutionalize teacher accountability for instruction in essential workplace skills. Utah law requires public school teachers to develop course syllabi called "disclosure documents" for every course, providing both students and parents with a narrative overview of the course content, along with objectives, specific tasks, materials, grading policy, and the assignments students must complete. At Horizonte, staff have come to view the disclosure documents as contracts that teachers make with students and parents.

Beginning in September 2000, Horizonte will ask teachers to integrate objectives, tasks, and assignments related to the teaching of selected workplace competencies into their disclosure documents. It expects this step to engrain more deeply the teaching of workplace competencies into all coursework and further clarify the expectations that teachers and the school have for students' development of those skills. As a prelude, professional development sessions during the winter and spring of 2000 will center around familiarizing all teaching staff with the SCANS report and SCANS skills.

Contact Information

James P. Andersen, Principal
Horizonte Instruction and Training Center
1234 South Main Street
Salt Lake City, Utah 84101-3117
Phone: (801)578-8574
E-mail: james.andersen@horizonte.slc.k12.ut.us
Web site: www.slc.k12.ut.us/sites/horizonte

Case Study:

Long Beach City College

In June 1996, Life Management instructors from 12 community colleges in California came together for an intensive retreat to share teaching resources and strategies. Many of the participants felt that the textbooks and class materials then available were too theoretical for their course, which teaches essential skills for effective functioning throughout the life span in the work, home, and community environments. Seeing the need for practical tools for teaching SCANS skills and shifting toward active, engaged learning, the teachers decided to develop materials explicitly focused on SCANS skills. The result, based on real classroom experience, was SCANS: Teaching Life Management Skills in California Community Colleges.[3] *The California Community Colleges Chancellor's Office, which had sponsored the 1996 retreat in cooperation with Long Beach City College and other participating community colleges, has published this handbook and distributed it to all 106 schools in the state community college system.*

In general, the SCANS Report and promotion of workforce readiness are associated with reforms at the high school level (particularly school-to-career initiatives) and workforce development programs. Yet workplace readiness and the development of high-performance skills should be central to postsecondary education as well. In California, Long Beach City College illustrates the potential of community colleges for playing a central role in teaching SCANS skills in a broad range of programs—within the college, in relationships with high schools, and in partnerships with welfare-to-work programs and other workforce development programs.

The 1996 retreat and follow-up efforts represent one of a number of SCANS-related activities that Long Beach City College has undertaken. Cited by *Community College Week* in both 1993 and 1995 as one of the nation's most effective community colleges, LBCC is a leader among postsecondary institutions in leveraging SCANS to serve its students and the community.

Key Lessons

LBCC's experience provides valuable lessons for effective teaching practices and change strategies for connecting postsecondary education to the SCANS skills:

- LBCC is explicit about SCANS development and uses multiple approaches to developing SCANS Skills.
- LBCC builds institutional and community awareness and understanding of SCANS in a number of ways, many of them quite simple.
- Not only are workplace readiness and the development of high-performance skills central to postsecondary education at LBCC, but the college uses its relationships with its partners in both education and workforce development to promote broader use of SCANS.
- LBCC uses the national, state, and local systems in which it operates to reinforce its SCANS focus and help the school provide incentives for including SCANS in all work.

---

[3] *SCANS: Teaching Life Management Skills in California Community Colleges* can be purchased ($30) from the LBCC Bookstore, 4901 East Carson St., Long Beach, CA 90808. It is also a key source for a more formal textbook and instructor's guide by Joann Driggers: *Life Management Skills: Taking Charge of Your Future* (Delmar Publishers, 1998).

Teaching and Assessing SCANS at Long Beach City College

Established in 1927, Long Beach City College serves Long Beach, Signal Hill, Avalon, and Lakewood, California. It is one of the nation's largest community colleges, with over 25,000 students. Only nine two-year institutions in the United States award more Associate Degrees to minority students.[4]

Like all of California's 106 community colleges, the state Chancellor's Office and Board of Governors, plus a locally elected board, oversee LBCC; a six-person local board of trustees governs its operations. Within California's postsecondary education system, the primary mission of the community colleges is to provide academic and vocational education. By law, these schools must admit any California resident who is over 18 years of age and "capable of profiting from the instruction offered."

That mission does not make the SCANS report and skills an explicit institutional priority, yet SCANS is central to many LBCC courses, programs, and activities. Individuals, teams, and whole departments have carried out a wide range of SCANS-related activities that directly relate to LBCC's mission as a community college.

Teaching Life Management

In the spring of 1995, Long Beach City College applied for a State Leadership Grant from the Chancellor's Office to build awareness and use of SCANS within the California community college system. LBCC received the first of two one-year grants, beginning in the fall of 1995, for a project focused on the Family and Consumer Sciences discipline statewide. At least one faculty member and one employer from each of the five areas in the Family and Consumer Sciences Department participated on a project Design Team; one of the faculty members, Lynne Miller, who was also Coordinator of Vocational Education, led the project.[5] Math and English instructors also served on the team to promote the integration of traditional academic areas in the project.

During the first year of the grant, the Family and Consumer Sciences instructors participated in both internal and external professional development activities that improved their capacity to use the SCANS skills and engage in active teaching strategies, including project-based and work-based learning. The Design Team developed and implemented mechanisms for sharing teaching strategies and innovations. Each departmental area documented promising practices in teaching SCANS skills, and the team used that information to specify strategies for integrating academic and vocational skills and ensuring the relevance of curricula to the development of SCANS workplace skills.

Next, the project field-tested these strategies in LBCC courses and at community-based locations. Drawn from LBCC's State Leadership Grant, mini-grants were awarded to instructors, community organizations, and partnerships to support the field-tests. The Design Team also developed an approach, with supporting tools, for reviewing curricula to ensure the inclusion of SCANS skill development.

At the end of the year, the project focused more specifically on the Life Management area of Family and Consumer Sciences, which led to the 1996 retreat. Sixteen Life Management instructors from twelve community colleges met for an intensive, two-day retreat, culminating with the publication of *SCANS: Teaching Life Management Skills in California Community Colleges.*

---

[4] "Top 100 Rankings," *Black Issues in Higher Education* Web site, http://www.blackissues.com.

[5] The five areas are Life Management, Fashion, Nutrition and Food, Interiors, and Life Span (Child Development, Family Studies, and Gerontology). While the success of LBCC's SCANS efforts depend on many people, Miller has been at the hub of much of the activity and has consistently promoted the incorporation of SCANS into LBCC programs. Miller has since become Director of Economic Development at Long Beach City College.

The Chancellor's Office has published and distributed this catalog of instructional resources and teaching strategies to the Family and Consumer Sciences Departments of all California Community Colleges. "Part 1: Instructional Resources" provides 47 classroom activities and assignments that can be used in Life Management courses, as well as for other subjects. A cover sheet for each activity identifies at least one SCANS skill that the activity is designed to develop. This section includes an extensive list of other resources available to instructors and students. "Part II: Teaching Strategies" emphasizes the need to shift toward active and engaged learning to best develop SCANS skills. It includes tools and guidance for creating active learning environments in community college courses.

SCANS: Teaching Life Management in California Community Colleges

SAMPLE LESSON

Lesson: The Cost of Convenience[6]
SCANS Skill Developed: Resources—Management of Money
Description: Students compare the cost of doing a task or preparing an item "from scratch" with the cost of using a similar service or prepared item. For example, a student may choose to compare the cost of personally changing the oil in his or her car with the cost of taking the car to a garage. They consider a variety of factors and reflect on the outcomes using a worksheet that asks:

- How long does it take to accomplish the task yourself?
- What are the costs involved?
- What equipment is needed?
- Are you satisfied with the results when you do the task yourself?
- Who can you pay to do the service?
- What is the cost of the service?
- What is included in the service?
- Are you satisfied with the results when you have the service done professionally?
- What are your conclusions?
- Will you do the task yourself or use professional help? Why?

Similarly, a student may elect to compare the cost of preparing an item of food with buying a similar prepared food. The worksheet would compare the total cost of ingredients to the cost of the prepared food. It would also ask the student to consider preparation steps, preparation time, baking time, and the amount each method yields. Finally, the student would evaluate the quality of the two foods and recommend one of the two options.

---

[6] Adapted from *SCANS: Teaching Life Management in California Community Colleges*, Chancellor's Office, California Community Colleges, June 1996. From a project submitted by Lynne Miller, Long Beach City College.

STAR: Students and Teachers Achieving Results

Students and Teachers Achieving Results targets Long Beach City College's most at-risk students. The college recruits students with the lowest reading and math skill levels for the STAR program; nevertheless, the participants generally represent the age and ethnic diversity of LBCC's student body.

Each semester, about thirty students take the seven STAR courses, which the school offers as a group of connected courses taught in a small learning community. STAR is designed to help at-risk students develop basic academic skills (e.g., reading, writing, math) and also life management and college success skills and strategies. The content centers on students' personal experiences. For example, much of the writing practice is accomplished through personal journals.

SCANS skills provide the basis for STAR and give instructors a framework for identifying intended outcomes in each course. For example, if students develop the SCANS Thinking Skill, "Knowing How to Learn," by learning how to take class notes in the College Study Skills course, other instructors will explicitly reinforce this skill in their own courses.

The seven STAR instructors (including Lynne Miller, who teaches Life Management) meet weekly to share course plans and discuss how to reinforce the learning of skills—especially SCANS skills—across courses. They also discuss student progress and problems.

Because STAR instructors believe in a "hierarchy" or sequence of SCANS skills for students, the program focuses most heavily on foundation skills (basic skills, personal qualities, and thinking skills). However, the instructors also incorporate the five SCANS competencies as appropriate to specific lessons and student needs, and SCANS is central to the delivery of instruction as well as to the development of curricula. Instructors give each STAR student the whole list of SCANS skills at the beginning of the program and often refer directly to specific skills during class. Eventually, the teachers ask students to identify the skill or skills that a particular lesson or activity will help develop.

Technical Certificates

The LBCC School of Trades and Industrial Technologies issues "Certificates of Completion" for its courses of study. These certificates indicate mastery of specific technical course work, for example, Electronic Fuel Systems and Gas Tungsten Arc Welding. Three people sign each certificate: the instructor, an industry representative, and the dean. The certificates are intended to answer employers' need for information concerning potential employees. They also prompt instructors to explicitly include SCANS skills in their courses.

On the back of the certificate, the instructor rates the student's demonstrated degree of competency in broad SCANS skills as well as in technical skills relevant to the particular area of study. The following SCANS skills are included:

- *Basic Skills:* Reading (at least at eighth grade level), Math (at least at eighth grade level), Writing, Speaking;
- *Thinking Skills:* Decision Making, Problem Solving;
- *Personal Qualities:* Relations with Others (Sociability), Dependability (Responsibility and Integrity), Work Attitude (Self-Esteem), Personal Behavior (Self-Management), Professional Appearance.

Each skill is rated on a three-point scale:

3: *Mastered:* Can work independently with no supervision;
2: *Requires Supervision:* Can perform job completely with limited supervision;
1: *Not Mastered:* Requires instruction and close supervision;
N: *No Exposure:* No experience or knowledge in this area (i.e., the skill cannot be assessed).

Ratings are left to each instructor's judgment, except that the certificate specifies that "the rating for each task should reflect employability readiness rather than grades given in class." Students must document demonstration of competencies for the certificates, although no standard or rubric has been developed for assessing competency.

The Tech Center

LBCC's Tech Center provides multimedia-based instruction that supplements technical coursework. Its individualized programs of instruction use computer technology, videos, and self-paced materials. The center also maintains a library (both books and computer resources) of trade-related materials, especially those that develop basic academic skills (e.g., reading, writing, math) in an applied setting.

Students can also develop employability and computer skills through the Tech Center, where contextual learning approaches help students develop the SCANS basic skills. For example, LBCC is creating a series of trade-specific vocabulary programs that foster reading comprehension while teaching industry terminology. The Tech Center also provides resources and instruction around other employability skills, particularly ethics and customer service.

Professional Development and Curriculum Review

Professional development has been key both to the STAR program and the redesign of the Life Management course. In both cases, participating instructors have received structured learning opportunities to explore ways to integrate SCANS into coursework. As interest in SCANS has grown at LBCC, the college has expanded these opportunities to include a broader range of faculty and staff. LBCC designates certain days for internal professional development of its faculty and staff. On these days, Lynne Miller and other individuals often offer voluntary sessions on SCANS.

California's community college curriculum review process reinforces the importance of SCANS and offers additional professional development opportunities for instructors. The Chancellor' Office requires each vocational department of each community college to review its curriculum, indicating the courses in which the SCANS foundation skills and five competencies are taught. LBCC has provided the support and incentive for departments to go beyond simply fulfilling this obligation to using it as an opportunity to reflect on course content and teaching practices. Some LBCC departments address the state assignment within a retreat format. Instructors think about both how they teach SCANS skills and how they might change, adapt, or expand courses to include more SCANS skill development.[7]

---

[7] With little accountability for completion of this task, a few LBCC Departments have taken the assignment less seriously, reporting that every course developed nearly every SCANS skill.

Integrating SCANS Into Welfare-to-Work

Long Beach City College, like many community colleges across the nation, has a long history of involvement in local workforce development activities. This is even part of the mission statement for California Community Colleges, which states that one of their purposes is "to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force development." With the arrival of the national Workforce Investment Act and federal welfare reforms, many community colleges have expanded their role beyond traditional pre-employment training programs.

LBCC has been an active partner in the design and implementation of Long Beach's welfare-to-work initiative. For that effort, Long Beach City College is one of ten initial sites in a national pilot of the Career Transcript System.[8] Developed at the SCANS 2000 Center of Johns Hopkins University, the Career Transcript System is designed to help individuals document and improve critical workplace skills (i.e., SCANS Skills).[9] The term "transcript" connotes life-long learning and continuous improvement. The Career Transcript System is also intended to provide employers with an assurance that new and incumbent employees have the skills necessary to succeed in the workplace.

The basic process of the Career Transcript System being piloted in Long Beach has seven steps:

1. All welfare-to-work participants who are placed in jobs are referred to the Career Transcript System. This is facilitated by the fact that the Career Transcript System offices are housed in the Career Transition Center, Long Beach's "one-stop" career center, as is the city Welfare-to-Work Office.

2. Participants' skills are assessed using the AlignMark's AccuVision Systems.[10] AccuVision uses video, computer, and job simulation to measure job-related skills. For the Career Transcript System, Long Beach uses the "Customer Service" test because it applies to a wide number of jobs and gives feedback on a number of SCANS Skills. The feedback report generated includes a skill ranking, an analysis of individual strengths and weaknesses, and strategies for personal development. Career Transcript System counselors do not use or show the client the skill rankings.[11] Instead, they focus on the analysis.

3. Career Transcript System staff work with worksite supervisors to build their buy-in into the system and provide informal training on their role. The staff focus not just on employers with welfare-to-work placements but also try to develop new employer connections. The selling point is that the Career Transcript System can lower employee turnover and raise productivity.

---

[8] The U.S. Department of Labor awarded Johns Hopkins University the grant for the Career Transcript System, and the university selected pilot sites. Long Beach City College is subcontractor for the local project and employs the project staff. The City of Long Beach and the Career Transition Center are project partners.

[9] The SCANS 2000 Center is run by Dr. Arnold Packer, former Assistant Secretary of Labor, co-author of *Workforce 2000*, and former Executive Director of the Secretary's Commission on Achieving Necessary Skills (SCANS) at the U.S. Department of Labor. For more information, visit the SCANS 2000 Center's Web site at www.scans.jhu.edu.

[10] For more information on AccuVision Systems, go to the Web site: www.alignmark.com. The SCANS 2000 Center has posted a presentation regarding AccuVision and the Career Transcript System at: www.scans.jhu.edu/WtW/Presentations/AlignMark/assessment/ppframe.htm.

[11] The AccuVision system was developed for the general workforce. The Career Transcript Staff have found that welfare-to-work participants tend to get low, discouraging scores. Moreover, the scores provide no useful information to anyone who is not very familiar with the AccuVision assessment. The analysis section provides more useful, readable, and constructive information. Career Transcript System pilot sites are providing feedback to Alignmark, through SCANS 2000, on the use of AccuVision with welfare-to-work participants.

4. With the guidance of the Career Transcript System staff, worksite supervisors complete the first AES[12] *International Skill Coach Assessment forms.* Worksite supervisors apply the AES SCANSkill ID rubric to the job that the welfare-to-work participant will hold, not to the individual. The rubric breaks each of the 37 SCANS skills into five levels of performance.[13] The application of the rubric yields six skills most critical to success in the job and the level to which those skills need to be performed. The Career Transcript System staff and the employer then create an "Employee Performance Assessment" form.

5. Participants, worksite supervisors, and Career Transcript System staff work together to create individual skill development plans. Using the information gained from the skill assessment and the Employee Performance Assessment, the partners create a skill-development strategy that may include on-the-job training, coursework at LBCC, training at the Career Transition Center, or other learning opportunities. Because the Employee Performance Assessment form clearly states the SCANS skills on which the employee will be assessed, the skill development plan can target activities that are most likely to promote workplace success. This process can be time intensive, but it makes clear to employers the benefit of setting goals and creating accountability for SCANS skill development.

6. Career Transcript System staff create Online Career Transcripts for welfare-to-work participants.[14] These documents are designed to be viewed and sent electronically or printed as a traditional résumé. In addition to education and employment histories, the Career Transcript gives evidence of a person's attainment of SCANS skills. Assessments (such as the AccuVision System), employer input (including the Employee Performance Assessment), and demonstrations in training and educational settings (including LBCC coursework) all provide evidence of competency in a skill. Only Career Transcript System staff may add to or change the transcripts, but participants can view their own transcripts and elect to "hide" elements. Employers can view their employees' transcripts and submit comments to the staff as necessary.

In addition,to the Career Transcript System project, LBCC's Office of Workforce Development provides support to welfare-to-work participants enrolled at the college. This office coordinates educational services (such as tutoring) and other support services (such as childcare) for clients.

---

[12] ADVANCE Educational Spectrums, Inc. For more information, go to: www.skillcommand.com.

[13] For example, the Workplace Competency of "Acquiring Information" is divided as follows: 1) selects/obtains data/information relevant to the task; identifies need for data. 2) identifies data/information; predicts outcomes. 3) analyzes data; integrates multiple items of data; contrasts conflicting data. 4) researches additional information sources; creates data gathering process. 5) validates appropriateness of data/information; Justifies outcomes/results; evaluates data accuracy; evaluates relevance of data. *Taken from the AES SCANSkill ID, copyright 1994, ADVANCE Educational Spectrums, Inc.*

[14] Long Beach had just started this phase in late 1999 and had not completed any transcripts.

Lessons Learned

Long Beach City College plays a central role in teaching SCANS skills in a broad range of programs—within the college, in partnerships with as welfare-to-work and other workforce development programs, and in relationships with high schools. Its SCANS-related activities have yielded valuable lessons for education, training, and workforce development, showing the potential of community colleges for this type and level of work. These lessons are most applicable to community colleges, but they can be useful to any institution or system interested in promoting SCANS Skill development.

LBCC is explicit about SCANS development and uses multiple approaches to developing SCANS Skills.

In all the activities outlined here, students and instructors are aware of the broad context of SCANS and the particular skills they are trying to develop. Classroom handouts, instructional resources, and other LBCC materials often refer directly to SCANS skills. Furthermore, employers do not have to infer an individual's skills from traditional grades or resumes. These skills are documented on the Certificates of Completion and through the Career Transcript System.

While LBCC has a unifying, system-wide focus on SCANS skills, the institution remains flexible and diverse in its delivery of instruction and other services. A look across LBCC's SCANS-related activities reveals many different approaches to learning and assessment, including: computer simulation, on-the-job training, applied learning, traditional classroom learning, one-on-one tutoring or mentoring, teamwork, and authentic assessments. The goal of using multiple approaches is to make instructional strategies appropriate both to the goal and to the learner. Another advantage is to keep SCANS skill development central to all activities, rather than a separate piece of certain activities.

LBCC builds institutional and community awareness and understanding of SCANS in a number of ways, many of them quite simple.

Professional development and related tools are critical to LBCC's success in creating institutional and community awareness of SCANS skills. Also important is that LBCC is explicit about SCANS skill development with teachers, students, and employers. Further, it produces a great deal of materials for its many SCANS-related activities, and these resources frequently refer directly to and give an appropriate explanation of SCANS.

Often, language comes from the SCANS report itself, and the acronym "SCANS" is itself used repeatedly. There is even an LBCC "SCANS" logo, which appears on everything from notepads to tools to publications. Lynne Miller has created a one-page summary of SCANS and its impact on teaching and learning. The goal is to introduce SCANS to all partners, keep it in the forefront of their thinking, and provide them with quick and easy access to information about it.

Not only are workplace readiness and the development of high-performance skills central to postsecondary education at LBCC, but the college uses its relationships with its partners in both education and workforce development to promote broader use of SCANS.

Community colleges have a unique potential to promote teaching and learning of SCANS skills in a broad range of workforce development programs, in high schools, and in postsecondary education. SCANS fits well with the traditional mission of community colleges, making it easier for these schools to make—and explain—connections that join SCANS with education and training practice at all levels.

LBCC's SCANS-related activities are a natural extension of its role as part of a seamless, articulated education system that includes primary and secondary education, two- and four-year colleges and universities, and workforce development institutions. In the state educational system, LBCC delivers traditional instruction in "academic" areas (i.e., the Basic Skills), and it also has structured relationships with K-12 school districts and other postsecondary institutions. At the same time, LBCC has a long history of relationships with employers and direct involvement in the local workforce development system. All these connections have built LBCC's institutional credibility and provided additional leverage for promoting SCANS locally.

LBCC uses the national, state, and local systems in which it operates to reinforce its SCANS focus and help the school provide incentives for including SCANS in all work.

LBCC applies for many federal grants that require SCANS-related outcomes. For example, applications for funds under the Carl D. Perkins Vocational and Technical Education Act (commonly referred to as either Perkins or VTEA) must address SCANS Skills. For staff applying for VTEA funds, LBCC has created a resource packet that emphasizes this requirement. As noted, the California Community Colleges Chancellor's Office requires departments to map their curricula against the SCANS skills in the formal review process.

As many existing and potential funding sources seek to ensure that their support will advance workforce development goals, LBCC is promoting the inclusion of SCANS in its development process. These national, state, and local systems provide support, legitimacy, and resources for teaching SCANS skills and have played a central role in making change possible.

Contact Information:

Lynne Miller
Director of Economic Development
Long Beach City College
1305 East Pacific Coast Hwy.
Long Beach, CA 90806
Phone: (562)938-3123
Fax: (562)938-3990
E-mail: lmmiller@lbcc.cc.ca.us

Case Study:
North Clackamas School District

Through a partnership with McDonald's, high school students in the computer-assisted-design class entered a competition to design a new restaurant. In teams, the students interviewed McDonald's architects, determined company specifications and local building codes, worked with an association of general contractors to create designs, and presented the designs to an expert panel. One of the designs won the competition, and McDonald's used it in constructing a new restaurant two miles from the students' school in North Clackamas, Oregon.

Real-world projects like this are the cornerstone of the North Clackamas School District's strategy to teach students rigorous academics and essential workplace skills. With the goal of increasing students' motivation to learn and their opportunities to practice, develop, and strengthen their knowledge and skills, the district has made a concerted effort to link the schools with adults in the community who are solving real problems, creating real products, and meeting real world standards. In designing the McDonald's restaurant, for example, students applied technical knowledge and skills to create a complex product. They used high levels of teamwork, mathematics, and computer-assisted-design technology; found and interpreted information; solved unanticipated problems; and conducted complex planning. They did the same tasks an architect would, meeting real specifications and standards. Students report that the work felt important; the goal was not just to get a good grade.

In the North Clackamas district's systemic approach to education reform, teachers, schools, the school district, the business community, and the state all play important roles in creating opportunities for project-based learning and career-related learning experiences. Initiatives at the district and local level and among employers have mirrored priorities in the state's far-reaching 1991 education legislation, which tied reform to workforce development and identified specific content and performance standards for student achievement.

Key Lessons

North Clackamas provides important lessons about state, district, school, and business community practices for creating, sustaining, and expanding the effective teaching of essential workplace skills:

- The school district, in collaboration with business partners, provides opportunities for students to work on projects of real value to the school and larger community. This teaching strategy has proven to be effective for learning foundation skills and essential workplace competencies.

- Focused professional development, explicit learning standards, and strong community partnerships are critical to efforts to provide opportunities for large numbers of North Clackamas students to learn high-performance competencies in the workplace and the community.

- As North Clackamas moves toward reform on a scale that reaches all students, it benefits from the alignment of systems and structures among schools, the school district, the state, and the business community. This has created a change process in which the actions of each of these groups reinforce those of the others. Without alignment, policies and practices at any level can be serious obstacles to reform at other levels.

Project-Based Learning

Project-based learning is at the heart of district and school strategies designed to help North Clackamas students learn a combination of essential workplace skills and rigorous academics. After five years of district and school-based reform, nearly half of high school teachers have participated in professional development around contextual, project-based learning.[15] The results of this investment in teacher learning are evident in the growing number of examples of effective practices for teaching high-performance competencies, as well as in the quality of project design and instructional practice.

Examples of Project-Based Learning in Classrooms and the Community

Although the following examples of high-quality teaching and learning in North Clackamas are not yet typical, the district's explicit goal is to move deliberately in directions that will allow all students to experience similarly powerful learning opportunities.

Creating a Community Policing Plan

Student teams in a law enforcement class at the Sabin Skills Center, a regional professional-technical center, simulated the creation of a community policing plan to address a set of local problems.[16] The teacher provided basic information about such topics as community demographics, economic and employment data, neighborhood conditions, street lighting, and crime, as well as information about local resources upon which solutions could draw. The teams used all this data, along with the community policing principles they learned in class, to develop a strategic plan that would yield immediate, visible results and also offer long-term solutions.

The teams had to make many decisions. What information was important? What were the most pressing problems and for whom? What were the causes of key problems? What community resources would be most useful? With no unique right answers, the resulting plans differed fundamentally in terms of the problems they addressed, the solutions they adopted, the community resources they mobilized, and their strategies to involve community partners.

Process was as important as product for the simulation, and teams had to be explicit not only about what they did but why. What information led them to choose one path rather than another? What community policing principles led them to adopt a particular strategy? Grades reflected team and individual performance, the quality of the process the students used, and the quality of their community policing plan.

Quality Improvement Teams

After a quality-improvement consultant provided two days of training in the principles and tools of his profession, small teams of students spent five days in a workplace solving real business problems. Students had to 1) frame the problems they found there; 2) work as a team to accomplish tasks on time; 3) collect, analyze, and use information to develop effective, feasible solutions; and 4) communicate their findings to employers and workplace employees.

---

[15] North Clackamas, a suburb of Portland, Oregon, has 14,500 public school students in eighteen elementary schools, one charter elementary school, four middle schools, three high schools, and a regional professional-technical center.

[16] The Sabin Skills Center offers half-day, multi-disciplinary, career-oriented programs for students from area high schools. Students complete academic requirements for graduation at their sending schools.

The school district asked one team to address problems that some parents had encountered when trying to communicate with schools. The team arrived at the district office with quality improvement "tools" in hand and went to work. They surveyed parents and teachers, looked into the phone system, and interviewed staff in the physical plant department. After analyzing all this research, the team proposed a number of possible solutions, including physical changes that would help solve the problem, along with an estimate of the costs, as well as changes in school policies and expectations.

The Oregon Health Sciences Lab asked another team to solve the problem of missing lab specimens. For a week, the team interviewed lab and data-entry employees, then proposed a quality-control plan that would use bar codes to solve the problem. The team presented its findings to lab employees, who responded that bar codes would be a good solution if the cost were not too high. The student-consultants had already calculated the costs and could respond.[17]

GATE American Dream Project

In the American Dream Project at Rex Putnam High School, student teams learned principles of economics, production, marketing, and advertising. They used what they learned to design new products, going through the steps a business would take to move a product idea from conception to completion: a feasibility study, R&D to create a prototype, a detailed marketing plan (including an advertising proposal), a manufacturing and production plan (enlisting the aid of experts in the field as needed), and a product flow chart from raw materials to finished product. Teams presented their products at a multimedia trade show, before an audience of students, teachers, and outside adults. Each student wrote a paper, was responsible for teaching others in the group, and received grades for both team and individual performance.

This American Dream Project is an ongoing part of the GATE Program, an interdisciplinary ninth and tenth grade learning community. GATE features an integrated curriculum, strong teacher relationships with students and parents, and project-based learning aligned with learning benchmarks for social studies, science, and language arts. According to "action research," conducted by Rex Putnam teachers, GATE students have higher attendance, lower behavior referrals, and better grades than peers in non-integrated classrooms.

Effective Teaching and Learning Strategies

Those three examples of project-based learning experiences in North Clackamas differ in many respects, yet they share a core set of principles and strategies that define effective practices for teaching high-performance competencies: *well-designed projects provide opportunities to work on meaningful real-world problems or activities that are important and have an audience beyond school.*

---

[17] Quality-improvement teams have proven to be a powerful learning experience. However, the district is concerned that the teams entails high costs for training teachers and students, while reaching relatively few students. It is exploring approaches that would make it possible to involve more students in less-intensive learning experiences. For example, a physics teacher is exploring opportunities to pair students with engineers who are expected to identify a problem and work to solve it in their own companies.

Each of the projects engaged North Clackamas students in work that adults do in the real world, using the same knowledge, skills, and tools as practitioners in the field. Students solved real workplace problems, created a community policing project to address problems found in many cities, or created detailed designs and plans for new products.

Projects provide opportunities for students to learn and apply a broad range of essential workplace skills. All these projects required students to use essential workplace skills: work in teams, solve problems, gather and interpret information, make decisions, communicate extensively, make plans, design products. In each case, students used the same knowledge and skills an adult would use.

Teachers provide instruction in the knowledge and skills students need in competing the project. Coursework provides explicit instruction in the academic and work-related knowledge and skills students needed for the projects. Students learn about quality improvement tools, for example, knowing that that they would use what they learned to do authentic work that was important to them. Teaching practices reflect a cycle of learning, practicing, and using knowledge and skills.

Projects provide explicit learning goals and clear performance standards for high-performance competencies. Oregon has developed content standards and criteria for personal management, problem solving, communication, teamwork, organizations and systems, employment foundations, and career development. These state-mandated learning standards provided explicit learning goals and standards for all these projects.

Teachers serve as a facilitator or coach and students are active learners. Teachers provide clear standards, deadlines, ongoing assessment, and opportunities for reflection and critique, and they teach knowledge and skills students would need for the project. Students are responsible for creating and carrying out workplans and timelines, managing teams, making decisions about how to perform tasks, figuring out what information they need and how to get it, and identifying and solving problems that arose.

Projects provide opportunities for career-related learning experiences. Each of the projects provided opportunities for North Clackamas students to engage in career-related learning experiences that met state-mandated criteria for work-based experiences, community service learning, or school-based experiences.

Projects provide opportunities for adult connections, authentic audiences, and a sense of real world standards. Students consult with experts in developing a manufacturing and production plan, solve problems for real workplace clients, and present their work before an audience of invited adults.

Students are assessed based on their demonstration of specific skills and learning. Real-world standards form the basis for assessing student work. Is it a viable design to build an actual restaurant? Is it an effective solution to the workplace problem? Do students effectively apply workplace competencies, such as the abilities to function well in a team or to find and use information? Does the work effectively address community problems?

The level of complexity and the ease of implementation of a project can be tailored to fit students at various levels of their education. The quality improvement or community policing projects, for example, could be refashioned at a higher level of sophistication, complexity, and performance expectations to form a case study in management school. The quality improvement project be a two-week task, or it could extend over several months and expect students to find realistic solutions to more complex workplace problems.

Rigor in Project-Based Learning: The Six A's

Contextual project-based learning is the cornerstone of district and school strategies to teach high-performance competencies, according to Karen Phillips, Assistant Director of Secondary School Programs for the North Clackamas School District. An increasing number of North Clackamas teachers design, reflect on, and improve projects using the Six A's as guiding principles:[18]

- **Authenticity:** Projects use a real-world context (e.g., community and workplace problems) to teach academic and professional disciplines.
- **Academic Rigor:** Projects involve students in using methods of inquiry central to academic and professional discipline(s), and require higher-order thinking skills.
- **Applied Learning:** Projects engage students in solving semi-structured problems calling for competencies expected in high-performance work organizations (e.g., teamwork, problem-solving, communication).
- **Active Exploration:** Projects extend beyond the classroom and connect to work internships, field-based investigations, and community explorations.
- **Adult Relationships:** Projects provide students with adult mentors and coaches from the wider community.
- **Assessment:** Projects involve students in regular exhibitions and assessments of their work in light of personal, school, and real-world standards of performance.

North Clackamas use the Six A's as benchmarks for quality project-based teaching and learning and to assess and improve project designs. Teachers design projects to help students learn academic and professional-technical knowledge and skills as well as Oregon's career-related learning standards.

Systemic Change: Bringing Effective Practices to Scale

The state of Oregon, the North Clackamas School District, a significant number of North Clackamas teachers and school administrators, and the business community are implementing—independently and in concert—a common vision of education reform at a scale that will enable every student to have opportunities to learn essential workplace skills and participate in career-related learning experiences. For each of these stakeholders, the state's Career-Related Learning Standards and Career-Related Learning Experiences are a key focus of education reform.

The alignment of policies, practices, and structures across the different players has created a change process in which the actions of each reinforce one another. Without alignment, however, policies and practices at any level can be serious obstacles to reform at other levels. Thus, the process of instituting education reform for all North Clackamas students has required: 1) fostering conditions that support all teachers, principals, and schools in creating and sustaining change; and 2) removing obstacles at each level that stand in the way of reform.

---

[18] The Six A's framework was developed by Adria Steinberg of Jobs for the Future; *see* Steinberg, Adria. 1997. *Real Learning, Real Work: School-to-Work as High School Reform*. New York: Routledge.

State Reform

Oregon's education reform strategy, embedded in the Oregon Educational Act for the Twenty-First Century, calls for interconnected changes in curriculum, instruction, standards, assessments, and accountability. The state Board of Education and Board of Higher Education have both instituted core content and career-related learning standards, making Oregon the first, and only, state to do so throughout its educational system, from kindergarten through college. The state has adopted core content learning standards for English, mathematics, science, social sciences, the arts, and second languages, with criterion-referenced assessments to test proficiency. The Career-Related Learning Standards cover personal management, problem solving, teamwork, communication, workplace systems, career development, and employment foundations.[19]

Under the state plan, by the 2004-2005 school year, high schools are expected to reorganize the junior and senior years into focused programs of study—Arts and Communications, Business and Management, Health Services, Human Resources, Industrial and Engineering, and Natural Resources. These broad career areas will provide a context for rigorous academic and professional-technical learning and the development of career-related competencies. High schools must also provide opportunities for work-based, community-based, and school-based career-related learning experiences.

To help refocus education away from courses completion and toward the demonstration of competence, high schools will not only offer diplomas but also Certificates of Initial Mastery (CIM) and Certificates of Advanced Mastery (CAM). To obtain a CIM, students must meet state academic content standards in mathematics, science, social sciences, the arts, English, and a second language by passing a state assessment, completing performance-based assessment tasks, and submitting work samples for scoring by teachers using statewide scoring guides. To earn a CAM, students must also participate in one of the focused areas of study and in community-based, work-based, or school-based career-related learning experiences; in addition, they must meet career-related learning standards, assessed through local instruments and processes.

At the college level, the Oregon University System's Proficiency-based Admission Standards System (PASS) moves the focus of the admissions process from courses taken (i.e., Carnegie Units completed) to the mastery of knowledge and skills. To be accepted into a postsecondary institution in the state system, students will have to demonstrate their knowledge and skill in both the career-related and the core-content learning standards. The goal is to align college admission standards with the CIM and CAM standards to achieve an integrated set of standards that presents students with a single, seamless educational system from kindergarten through college.

District Reform

The North Clackamas School District has gone beyond state-mandated content standards and certification requirements, particularly with regard to restructuring high schools into focused programs of study, infusing career-related learning standards into curriculum and instruction, expanding and improving contextual learning, and developing high-quality, career-related, learning experiences. The goal is to integrate the academic rigor of a college preparatory program with the relevance of professional-technical education so that all high school graduates are prepared for college or for employment that enables them to support a family.

North Clackamas sees reform as a long-term process: building strong foundations for change and continuously extending and improving effective practices. As part of a district and school infrastructure that facilitates change, it has created the district-level position of school-to-career director, and it also supports school-to-career coordinators in each high school. Such staffing is central to developing and expanding the internal capacity and employer partnerships required to provide a range of career-related learning experiences for students.

---

[19] See Appendix D-1 for a detailed description of these standards and experiences.

The district reform strategy to benefit all students is also based on:

- Redesigning the curriculum to embed career-related learning standards and career-related learning experiences in the classroom;
- Investing significantly in sustained professional development, focused on project-based teaching and learning;
- Developing focused programs of study for implementation in all high schools;
- Developing performance-based standards and assessments that align with the skills needed to succeed in postsecondary education and in careers; and
- Redesigning graduation requirements to reflect program changes and require the demonstration of knowledge and skills as well as the completion of courses.

Redesigning the curriculum: The district is explicit that it will expect all teachers, K-12, to embed career-related learning standards in the academic and professional-technical curriculum. Teachers are mapping career-related learning standards to content standards to identify opportunities within the curriculum to teach high-performance competencies. In the 2000-2001 school year, the district will begin providing career-related learning experiences to juniors. The eventual goal is for all North Clackamas students to have opportunities for structured learning experiences—in the community, workplace, or school—that connect rigorous academic and career-related knowledge and skills through real applications. Six essential components will be consistent across all career-related learning experiences: real-world applications, applied learning, adult relationships, authentic assessment, the integration of academic and career-related learning, and an authentic problem, question, or product.

To meet this goal, district and school staff are working with the community to provide 2,000 career-related learning experiences annually for all juniors and seniors. The district is creating systems to support strong community partnerships, building on existing best practices in place in the district and nationwide. It is also developing assessment tools and guidelines for teachers and employers, with professional development for both groups.

Professional development: In 1995, the school district launched a system-wide professional development program in project-based learning. The training is designed around cadres, drawing about 30 teachers together for three intensive days over the summer and three full-day sessions during each school year, for a total of nine full days of professional development over the course of two years. In addition, lead teachers assigned to each cadre, as well as cadre members, work with one another to share and assess new projects and other teaching issues as they arise.

To date, 45 percent of the district's high school teachers have received training in project-based learning strategies, a number that approaches a critical mass of the faculty and school administrators working to bring about reform at the school level. More than 200 teachers have participated in two-year professional development cadres; by the time North Clackamas implements new high school graduation requirements, 255 out of 822 K-12 district teachers will have participated in professional development around project-based teaching and learning.

Focused programs of study: North Clackamas has begun restructuring all high schools to provide programs of study within six broad career themes that provide focus, context, and relevance for academic and professional-technical learning during the junior and senior years. Each program has several essential components: personal education plans, a culminating senior project, career-related learning experiences, focused electives, and the integration of career and academic learning.

Teams of teachers, school and district administrators, business representatives, parents, and students are designing these focused programs of study. Focused electives will be explicit about how students learn career-related learning standards and gain opportunities for career-related learning experiences.

Performance-based standards and assessments: The district has decided to implement the CIM and the CAM more quickly than the state mandates. In addition, each high school senior will design, develop, and complete a culminating project that is tied to his or her focused program of study and includes several essential components. For example, each senior project will have both written and oral components, include ongoing reflective assessment, involve the community, and demonstrate the mastery of reading, writing, speaking, and thinking skills.

Graduation requirements: To graduate, high school students will have to: complete four electives in a focused program of study that integrates academic skills and career-related learning standards; demonstrate proficiencies in reading, writing, speaking, and mathematics at the CIM level; complete a career-related learning experience during the junior and senior years; and select, design, and complete a senior project.

Reform Within Schools

Strong impetus and support for reform has come from "below," from teachers and school-based administrators, as well as from "above," from the district. This fosters a mutually reinforcing school-district partnership for sustainable, systemic change. School-level change helps promote and support district-level reform; in turn, district support is critical to deepening and expanding school-based reform.

Five years of sustained professional development have built a large and growing network of teachers who provide peer support, feedback, and motivation to implement project-based learning in the classroom. Each year, the number of projects has increased and the quality of project-based learning has deepened. The growing visibility of teacher-designed projects, exhibitions of student work, and teacher-based research showing that project-based learning aligns with new state content and career-related learning standards have all helped build support among teachers, principals, and district staff.

State standards and assessments have played a critical role in the school-change process in North Clackamas, but many teachers, even those firmly committed to contextual learning, initially feared that the legislation would push them back toward traditional rote learning. "Action research," undertaken by a small group of teachers, played a critical role in sustaining school-based reform: it showed that project-based learning is, in fact, an effective way to teach state standards. The result is that Oregon's performance-based state standards provide key support for the growth of reform within schools; formerly skeptical teachers are coming to see that state standards require fundamental changes in teaching and learning.[20]

---

[20] State reform would have presented a formidable obstacle to school-based change if the standards had been "a mile wide and an inch deep" or at odds with contextual teaching and learning. Similarly, standards would have been a problem if committed teachers had not demonstrated the value of project-based learning.

Employer Partnerships

The Oregon Business Council, made up of 43 CEOs and other business leaders of Oregon's largest employers, has played an important role in supporting education reform statewide, including in North Clackamas. The focus of the council's efforts is to help 1) change the focus of education from measuring student "seat time" to documenting what students know and can do; 2) provide meaningful credentials and skills; 3) create rigorous academic and career-related learning standards; and 4) develop structured supports for contextual learning and quality career-related learning experiences.

Recognizing a serious mismatch between what students learn and what they will need to know as successful adults, the Oregon Business Council actively supports reform that makes classroom education more relevant and helps young people see that what they learn in the classroom connects with what they will need to know later in life. It further emphasizes reforms that provide clear transitions to postsecondary education, advanced training, and career employment and that achieve the necessary scale to provide work-based learning opportunities for all students.

In North Clackamas, employer groups like the Oregon Business Council play a critical role. They make it possible to implement career-related learning experiences on a large scale. This becomes especially important as North Clackamas works towards the goal of enabling all juniors and seniors to benefit from work-based learning and other career-related learning experiences.

To help employers develop and maintain partnerships with education, the Oregon Business Council created the Worksite 21 program. Worksite 21 has set quality standards for providing employer technical assistance and tools to make employer participation easier and more effective. It provides employers with direct consulting assistance, networking opportunities, and a wide variety of communication and training resources to strengthen existing school-to-career efforts and recruit more employers to participate in them. Through Worksite 21, employers learn how education partnerships can benefit them in addressing their workforce development needs, community relations goals, and long-term competitive business goals.

Among its many activities, Oregon Worksite 21 assesses employer readiness to partner with schools, helps establish or strengthen relationships between employers and school in local communities, and recommends organizational adjustments employers can make to accommodate students and teachers. It also provides examples of best practices and successful models of employer-school collaboration and helps employers share information and resources with one another and with schools. *The Bigger Picture,* an interactive CD-ROM and planning guide developed Oregon Worksite 21, helps employers get involved with students and teachers through teacher internships, job shadows, internships, classroom speaking, and school projects.

According to Worksite 21 Director Rene Leger, employers repeatedly insist that, now and in the future, their need is for young people with the high-performance competencies incorporated in the state's career-related learning standards. For example, Don Brown, who represents a large statewide health care system that is active in education reform, says that work-based learning and contextualized learning are familiar concepts in health care, high-tech, and retail businesses. Brown feels that SCANS skills (incorporated in the state reforms incorporate as career-related learning standards) are the ones most important to employers. Students need strong values and a work ethic that includes such elements as curiosity, an ability to learn and work in teams, and dependability, reliability, and eagerness to do a job well.

The Future: High-Quality Work-Based Learning for All Students

The North Clackamas School District is moving the long-term reform process in the direction of increasing scale and improving quality—to make high quality project-based learning that provides opportunities to learn and use essential workplace skills consistent across the district. In partnership with teachers and school administrators, the district is building a foundation of systems and structures so that every student has opportunities to learn career-related learning standards and participate in career-related learning experiences.

Operating within a supportive state reform process, the district, a large and growing body of teachers and school administrators, and Oregon Worksite 21 are increasing number of career-related learning experiences, improving consistency of quality, and aligning workplace learning closely with academic and career-related learning standards. Oregon Worksite 21 is looking for ways to expand employer involvement beyond the large employers that make up the Oregon Business Council base by working more with small and medium-size employers. The school district, in collaboration with teachers and school administrators, is moving toward full implementation of new graduation requirements and focused programs of study in all high schools. To make career-related learning standards and career-related learning experiences an explicit part of the curriculum, teachers are mapping how they incorporate career-related competencies, workplace learning, and community service learning in curriculum and instruction.

Contact Information:

Rene Leger, Director
Oregon Worksite 21
1100 Southwest Sixth Avenue
Standard Plaza, Suite 1608
Portland, OR 97204
Phone: (503)952-0001
Fax: (503)228-9767
E-mail: rleger@worksite21.org
Web page: www.worksite21.org

Karen Phillips
Assistant Director of Secondary Programs
North Clackamas School District 12
4444 SE Lake Road
Milwaukie, OR 97222
Phone: (503)653-3649
Fax: (503)513-4038
E-mail: kphillips@nclack.k12.or.us

Appendix D-1

Oregon Career-Related Learning Standards
and
Career-Related Learning Experiences

I. Career-Related Learning Standards

Personal management: Exhibit appropriate work ethic and behaviors in school, community, and workplace.
Examples: Plan, organize, and complete projects and assigned tasks on time; meeting agreed upon standards of quality; identify tasks that need to be done and initiate action to complete the tasks.

Problem solving: Apply decision-making and problem-solving techniques in school, community, and workplace.
Examples: Identify problems and locate information that may lead to solutions; identify alternatives to solve problem; assess the consequences of the alternatives; select and explain a proposed solution and course of action; develop a plan to implement the selected course of action; assess results and take corrective action.

Communication: Demonstrate effective communication skills to give and receive information in school, community, and workplace.
Examples: Locate, process, and convey information using traditional and technological tools; read technical and instructional materials for information and apply to specific tasks.

Teamwork: Demonstrate effective teamwork in school, community, and workplace.
Examples: Demonstrate skills that improve team effectiveness (e.g., negotiation, compromise, consensus-building, conflict management, shared decision-making, and goal-setting).

Organizations and systems: Describe how individuals fit into organizations and systems.
Examples: Describe how work moves through a system; describe how the parts of organizations and systems fit together.

Employment foundations: Demonstrate both academic knowledge and technical skills required for successful employment within a career endorsement area.
Examples: Apply academic knowledge with technical skills; use a problem-solving process to improve a school or community situation; select, apply, and maintain tools and technologies.

Career development: Demonstrate career development skills in planning for post high school experiences.
Examples: Assess personal characteristics related to educational and career goals; develop and discuss a current plan designed to achieve personal, educational, and career goals.

II. Career-Related Learning Experiences

Work-based experiences provide students with opportunities to apply academic and career-life knowledge and skills in the work environment, to take increased responsibility, and to acquire a more realistic understanding of the world of work. These experiences are closely linked to the students' classroom learning.

Community service learning provides structured experiences in thoughtfully organized community service activities that meet actual community needs. Projects are designed collaboratively by the student and the community and are closely linked to the students' classroom learning.

School-based experiences provide hands-on application through projects, which can include workplace simulations, student-managed business enterprises, and other activities on campus, such as the school newspaper or yearbook. School-based experiences engage students in complex, real-world problem solving that is academically rigorous, is relevant to students and the community, and empowers students as active learners. School-based experiences are structured and closely linked to students' classroom learning.

Case Study:
Rural Entrepreneurship through Action Learning

The "caterer" has come to the entrepreneurship class for help. Is it worthwhile, the businesswoman asks, to take a particular catering job? She tells students her fixed costs, the food cost per person, and what she charges. How many people will she have to serve to make a certain profit? Should she accept the job? For this simulation, students perform a breakeven analysis that helps them learn the concepts of overhead costs, per unit costs, profit contributed per sale, and breakeven point.

That exercise is part of REAL Entrepreneurship. In this and many other exercises, and at high schools, community colleges, and other settings around the country, REAL Entrepreneurship helps young people learn and practice the concepts and skills they need to start their own businesses. A student in a North Carolina REAL class, for example, dreams of opening a store to sell fiber-art supplies. Can she earn a living doing something she very much wants to do? Through REAL Entrepreneurship, this simulation is part of learning how to create a business plan for Sweetwater Natural Fibers, helping her find the answer. If she makes a mistake in the business plan, she could lose money and her business.

REAL—Rural Entrepreneurship through Action Learning—is a proven, high-quality national program centered around the preparation of a business plan to start, and, in many cases, operate, a new business. The stakes are high: what students learn links directly to the economic opportunities that will be available to them, whether in their own business or in the labor market.

As students develop a viable business plan for implementation, they apply knowledge and skills they learn in class to analyze the local economy, judge market opportunities, and decide on a business they would like to operate. This experience-based, student-centered learning fosters the entrepreneurial skills necessary to found and operate a business; it also develops a broad range of core skills and knowledge that prepares them for good jobs.

Key Lessons

REAL provides important lessons about 1) effective practices for teaching workplace essential skills; and 2) systems and structures to implement effective practices on a large scale while maintaining quality.

- *Experiential, real-world learning—the creation of an actual business plan—highly motivates REAL students to benefit from their education.* REAL students can find an immediate, practical, real-world application of classroom concepts.

- *Effective national and state-level systems, materials, and programs support local practice and make it possible for REAL to expand a skills-based program to many sites while maintaining quality.* REAL's comprehensive, field-tested curricular materials are fully developed, and teachers in a variety of settings have used them over several years to maintain program quality. Sustained professional development helps REAL instructors strengthen their practice of experiential, student-centered education and learn to be effective managers, coaches, and facilitators.

- *REAL's community connections provide educational resources, a context for learning, and access to economic opportunities.* Community partners are essential to REAL programs, and the community has a direct interest in the success of local business ideas.

Overview

Two decades ago, rural activists in North Carolina and Georgia founded REAL Enterprises to address two issues: 1) rural youth faced difficulties staying in their communities because of a lack of good jobs; and 2) when rural youth moved to urban areas, they often couldn't compete for available jobs. REAL is designed to help rural schools build young people's ability to identify opportunities to create their own businesses, thereby earning an income while also fostering local development. Students learn how to take advantage of untapped economic opportunities in rural settings and simultaneously develop the skills needed to get and keep good jobs.

Since 1991, REAL has created systems and structures that make it possible to maintain quality while expanding nationally. The program has grown from a few North Carolina and Georgia sites into a loose federation that brings together 12 state-level organizations, local sites across the country, and a national organization—REAL Enterprises, incorporated in 1991 and based in Durham, North Carolina. As of late 1999, this federation included sites at 250 high schools, 73 postsecondary institutions, and 140 elementary and middle schools. The Durham staff is comprised of a national director, director of professional development, evidence development coordinator, administrative assistant, and director of development.

Between 1995 and 1999, The Pew Charitable Trusts and the Annenberg Rural Challenge provided REAL Enterprises with funding to staff and equip the national organization, develop new curricular offerings, create a sustainable model for replicating REAL nationwide, and develop partnerships with like-minded organizations. In 1997, REAL received a multi-year grant from the DeWitt Wallace-Reader's Digest Fund to achieve three goals: increase the capacity of member organizations to support teachers and schools on an ongoing basis; increase the number of high schools offering REAL in those states; and document how REAL helps youth and adults acquire the skills necessary to become successful entrepreneurs and achieve educational goals and standards being developed in member organizations.

The core of the program at the high school and postsecondary level is REAL Entrepreneurship, a semester- or year-long course that guides high school and community college students through the process of creating small businesses. Students develop viable business plans that they can use as a blueprint for starting a business. Some REAL programs include a second course that helps students sharpen their ability to operate and manage an ongoing enterprise.

The curriculum has a wide utility: in North Carolina alone, 31 high schools, 31 community colleges, 1 middle school, and 2 regional economic development programs use it. In addition to REAL Entrepreneurship, REAL Enterprises has developed related programs for middle schools—Middle REAL—and, for elementary schools, the Mini-REAL program.

REAL classes attract people with a wide range of ages and educational and employment backgrounds, particularly at community college sites: for example, College of The Albemarle, in Elizabeth City, North Carolina, offers REAL Entrepreneurship in a non-degree program for adults. Some REAL students lack a high school diploma; others have earned a college or even professional degree. Some have an established work history; others are just entering the workforce. The common characteristic is that they all want to start a business. Because College of The Albemarle students take the course with that goal, REAL directly and immediately applies to a specific and personal need.

REAL and SCANS Skill Development

The REAL experience is not designed specifically around SCANS skills, yet it explicitly addresses a number of essential workplace skills and foundation competencies. REAL divides these into skills, knowledge, and products:

Skills: *Real Entrepreneurship gives participants opportunities to develop skills which increase their likelihood of success as entrepreneurs and which better equip them for life and the world of work, regardless of their ultimate career choices:*

- *Life Skills:* abilities related to living an effective and successful life, including critical and creative thinking, working effectively with others, problem-solving, communication, understanding the world of work, operating effectively within organizations, personal empowerment and effectiveness, using numbers, data, and technology, and business effectiveness

- *Opportunity Identification:* the ability to recognize favorable circumstances

- *Opportunity Evaluation:* the ability to measure and analyze opportunities for their feasibility and practicality

- *Opportunity Realization:* the skills required to seize opportunities: opening an enterprise, managing time and resources, getting and keeping employees and customers, managing assets, operating legally and ethically.

Knowledge: *REAL Entrepreneurship seeks to increase participants' knowledge in the following areas:*

- *Self:* personal attributes, attitudes, needs, goals, and capacities, especially as they relate to career choice

- *Planning:* effective planning strategies and process for business and other undertakings

- *Entrepreneurship:* the personal and professional realities of owning and operating a business

- *Business:* marketing, operations, and financial management

- *Legal Requirements:* permits, licensing, taxes, and other necessities of operating a small business legally and ethically

Products: *Real Entrepreneurship students create a number of products, including:*

- *Journal:* a documentation and evaluation tool which chronicles the process of analyzing self and community, planning an enterprise, and writing a business plan

- *Oral Presentation:* several opportunities for oral presentations in class which culminate in the presentation of the business plan to an audience beyond the class itself

- *Business Plan:* a comprehensive and substantive document which addresses an identified business or community need, is based on research of the local community, and is written for a significant enterprise, economic in nature, including for-profit and non-profit ventures and projects

- *Viable Ventures:* businesses, community services, or projects which students implement themselves or offer (as completed business plans) to other entrepreneurs, agencies, or organizations for implementation

Effective Teaching Practices

REAL's effectiveness rests upon project-based learning, with each student ultimately focused on creating an actual business plan, which they may use after the course ends. With this approach, students are highly motivated to learn and have rich opportunities to apply workplace essential skills. Thus, the curriculum meets the learning needs of each student as they use their own business idea as the context for instruction and application.

Throughout the curriculum, students learn basic principles related to business plans, conduct research relevant to their own business idea, and apply the results. For example, classroom activities may introduce the concept of calculating the business cash flow of a simulated business. The student creates a projected cash flow statement by estimating likely costs and revenues in operating her or his own business.
REAL stresses four themes within its experiential approach:

- *Students experience first-hand what planning and operating a business entails.* For any given activity, each learner actively participates in a concrete event or exercise. Learning is active and takes place within a concrete context.

- *Students reflect on experiences.* Students consciously and deliberately analyze and assess the impact of the learning experience, helping them identify its personal value.

- *Students expand on their initial classroom learning by drawing on additional resources,* such as written materials, the experience of community members, or their own research into underlying theories, principles, and abstract ideas.

- *Students apply their learning to the process of writing the business plans* they may actually use in their own businesses. What begin as classroom activities grow directly into steps that have immediate and real application and involve the student directly in that essential application.

To support REAL's experiential approach, each site is a partnership among a school, national and state REAL organizations, and the community, including Community Support Teams for each course. Teachers create the teams, which are comprised of local business people; in some cases, the team includes a REAL site liaison, assigned by the state organization as a resource, coach, and mentor.

The Community Support Teams are responsible for fostering the community connections that provide students with:

- Sources for acquiring specific information, such as lists of available commercial rental properties or places to apply for capital loans;

- An audience of informed reviewers for the presentation of business plans; and

- A ready-made business network when the student begins business operations.

In the process of preparing a business plan, students draw on the Community Support Teams as they learn and apply a broad range of essential workplace skills, many of which are embedded in the course's experiential nature. For example, getting specific information on lease rates for available stores, which is necessary for estimating cash flows, involves: (a) recognizing local real estate agents as a resource; (b) scheduling an appointment with one or more agents; (c) meeting with the agent; (d) asking questions that result in useful data; and (e) exercising professional judgment in "plugging the data" into a cash-flow spreadsheet. In the process of performing these activities and gaining information, students also learn professional attitudes and behaviors, sharpen their own personal appearance, and begin the process of developing and exhibiting business conduct themselves.

REAL Principles and Key Practices

- Students and instructors work together on enterprises that reflect student needs, desires, and concerns.

- The instructor is a facilitator, coach, team leader, and guide, not the "boss."

- Instructors create opportunities for students to master basic competencies during the preparation and execution of the business plan.

- Students are active learners, not the passive recipients of information from a teacher. REAL emphasizes peer teaching, cooperative learning, and teamwork.

- Students connect with their communities, working with people and groups outside the classroom.

- The audience for student work extends beyond the classroom.

- Course content builds progressively to a clear goal and provides ample opportunity for thoughtful reflection.

Real World Assessments

For students who seek to launch a business, achieving that goal is one test of student learning and the value of REAL Entrepreneurship. For these students, success means identifying an existing but untapped market, enabling the student, and perhaps others in a community, to earn a living.

On the way to that goal—and for the many students, particularly in high school and at lower grades, for whom starting a business is not an appropriate program goal—REAL uses a variety of assessment methods to determine what skills the students master and at what level. National REAL Enterprises does not mandate specific assessments; each instructor selects the method or methods appropriate for a particular activity and student.

In general, REAL assessments involve one or more of the following methods:

- *Research applications.* Teachers assess how well a student has progressed in preparing a business plan. For example, the successful creation of a cash-flow projection indicates the student has mastered several intermediate research steps, such as planning and executing the research, scheduling and completing meetings as needed, and applying appropriate data from a range of data available.

- *Observation.* Teachers note how students act and behave during the course. For example, have students who began the course sitting quietly in the back become more vocal, participatory, and articulate? In general, teachers report that REAL students tend to dress better and develop a more professional attitude as a result of their exposure and participation in the business world.

- *Reflection.* REAL considers student reflection, captured in an interim product or written journal, the best assessment method, especially for determining mastery of "soft" skills. Many teachers conduct formal "debriefing" sessions with the full class, with students reporting on their experiences, sharing their thoughts and reactions, and developing strategies to improve the research and other products they develop in the course. The teachers assess the process as well as product—how students conducted research as well as the quality of research results. Student journals, a part of all REAL courses, also emphasize student reflection.

- *The business plan.* The main product of a REAL class is the actual business plan. North Carolina REAL has developed a Business Plan Review Checklist that students, teachers, and external reviewers can use in assessing the quality of student business plans. In most courses, students make an oral presentation to the Community Support Team, which acts as an external reviewer of the business plan and a practical check on its quality and feasibility.

- *Written tests.* Some teachers, especially at the high school level, use formal tests to assess the development of specific sets of skills, including both REAL skills and state-mandated standards. In North Carolina, for example, REAL has linked its core skills and assessments to the statewide standards in the Vocational Competency Achievement Tracking System.

- *Pre-class and post-class tests.* REAL Enterprises has developed pre-class and post-class multiple-choice tests that teachers administer on behalf of the national office. While a teacher can use these tests to evaluate student progress, they are primarily an element in the REAL strategy to evaluate program effectiveness. The pre-test documents students' baseline understanding of business and entrepreneurship. The post-test reveals specific knowledge about REAL and business operations and also documents a variety of post-course plans.

A Foundation for Expansion

REAL has developed systems and structures that make it possible to implement and sustain its teaching practices on a large scale while maintaining the model's quality. Centered on National REAL Enterprises, the federation of member organizations agrees on standards without a requirement for standardization.

Most important, REAL Enterprises provides a teacher professional development package that includes training, curricular materials, and technical support for entrepreneurship courses and programs. These REAL materials and services do not comprise an off-the-shelf curriculum, however. Rather, they are designed to offer teachers proven resources that they can use in different combinations and sequences, depending on such factors as the age and experience of their students. REAL encourages teachers to customize a course sequence within the context of the general goals for the entrepreneurship course.

The REAL Institute is an intensive, week-long, professional development course that all new REAL teachers take. It provides an overview of the REAL approach, guidance on small business development concepts, and instruction in using REAL curricular materials and techniques of active, hands-on experiential learning through project-based instruction. First-time participants work with experienced REAL instructors to learn about tools and techniques and begin developing relationships for continuing learning and networking.

Teachers who attend the institute receive *The REAL Entrepreneurship Curriculum Guide*, along with supporting tools, templates, and project materials. These have been prepared by REAL teachers with extensive experience in knowing what works in the classroom and the curriculum. In addition, REAL constantly field-tests new materials that teachers create; it includes the best materials in an ever-expanding curriculum notebook. The supporting materials include an Implementation Guide, Teaching Guide, Class Activities, and Individual Materials.

The *Implementation Guide* explains the REAL mission and techniques of program planning. It also covers how programs can: build support within schools and colleges from other faculty members; connect REAL courses with community resources; and access national and state networks of organizations and teachers who have REAL experience.

The *Teaching Guide* provides teachers with guidance in developing the content, sequence, and methodology of a REAL course. The guide contains course outlines, a summary of teaching methods, and a sequence that describes how to create, develop, and implement a business plan.

REAL Class Activities is a notebook containing 122 specific class activities. Each of these demonstrates at least one component of developing a business plan, uses active learning techniques, and gives ideas for student reflection.

REAL Individual Materials provides more than 200 distinct student activities. Among these are a wide variety of projects designed for students to complete while working independently on their business plans, such as planning and operating journals, as well as activities that relate to finance, operations, ethics, marketing, and community analysis.

In addition, *on-site support and in-service seminars*, offered by the state REAL organizations and REAL Enterprises, provide teachers with one-on-one support on-site and by telephone. This helps teachers practice new skills and trade strategies for effective teaching and learning. REAL also sponsors one-day and two-day in-service seminars on a state or regional level to provide opportunities for networking and sharing examples of effective professional practice.

REAL teachers also participate in networks for mutual support and to enhance their ability to serve as resources and trainers for future REAL events. At each site, veteran REAL instructors act as resources, mentors, and process observers for new teachers and to the students. At the regional and state level, REAL organizes periodic follow-up sessions that enable teachers to share ideas, get help on problems and issues, and learn quickly about new practices.

The Future

REAL Enterprises is constantly growing and changing. New sites join the network each year, and the set of curricular materials expands as teachers invent and test projects and activities. State and national REAL organizations constantly improve the professional development institutes, increase the value of professional networking and on-site technical support, and learn ways to better document skill formation and the impact of REAL students on community economic development.

For the immediate future, REAL is sharpening its program through three strategic steps:

- *Pursue a "cluster" strategy for expansion across levels.* Currently, REAL courses do not follow a sequence from level to level. That is, students who experience REAL in elementary school do not progress to REAL in middle or high school, then into postsecondary REAL experiences. In North Carolina, the state REAL is emphasizing the development of new program sites in places that already have courses. It expects this strategy to increase opportunities for mutual support and cooperation among teachers within a single community. A local cluster of programs is also likely to strengthen connections among sponsoring institutions, with a greater appreciation of how learning and experiences build on prior efforts. Nationally, REAL seeks to grow the program in areas where an existing state organization can support local sites.

- *Use technology to enhance program delivery.* REAL Enterprises wants to enable REAL programs to incorporate the Internet and on-line technology better. This will likely include, for example: helping students use technology to access information relevant to business plan development; helping teachers access curricular materials and course enhancements through the Web; helping students identify e-commerce business opportunities; delivering classroom activities via distance learning (i.e., without the need for students to attend a single physical location for class); and adding or enhancing instruction related to computer skills for REAL students.

- *Refine program assessments.* REAL assesses and documents ongoing program participation and the impact of courses. In response to various changes in the world of education, such as the standards movement and the SCANS skills, REAL is redesigning its "evidence development" strategies and tools. This effort includes redesigning demographic surveys; designing evaluation instruments that better capture what REAL students learn and do in class; and aligning the language, contents, and desired outcomes of REAL courses with standards set by states in which REAL is taught.

Contact information:

Richard S. Larson
National Director
REAL Enterprises, Inc.
115 Market Street, Suite 230
Durham, NC 27701-3221
Phone: (919)688-7325
Fax: (919)682-7621
E-mail: ricklarson@mindspring.com
Web site: www.realenterprises.org

Althea Riddick
Small Business Center
Department of Business, Industry and Technology
College of The Albemarle
P.O. Box 2327
Building E, Room 232
Elizabeth City, NC 27906-2327
Phone: (919)335-0821, ext. 298
Fax: (919)335-2011
E-mail: ariddick@albemarle.cc.nc.us

Case Study:
YouthBuild Rockford

"The positive energy and intelligence of young people need to be liberated and enlisted in solving the problems facing our society. Young people in poor communities want to rebuild their neighborhoods and their lives, and will do so if given the opportunity. The desire to serve, to do meaningful work which is of value to other people, is universal. Community-based organizations need to be given the resources to solve local problems and to mobilize local people, including neighborhood youth. Leadership development is a central element of effective community development and youth service."

—YouthBuild Rockford Vision Statement

YouthBuild Rockford seeks to unleash the positive energy of unemployed young adults to rebuild their communities and their own lives. Launched in 1995, the program provides unemployed young people between the ages of 16 and 24 with the opportunity to acquire construction skills, learn essential workplace skills, complete a high school education (usually through earning a GED), and receive leadership training while they rehabilitate or construct housing for low-income and homeless people.

Most YouthBuild Rockford participants are high school dropouts and come from very low-income families. Many of them face a variety of risk factors that can be barriers to employment or self-sufficiency. These factors can include a history of substance abuse, difficulty with daily problem solving, high levels of family conflict, past problems with school performance, problems with peer relationships, criminal justice involvement, or parenting issues.

YouthBuild Rockford blends local experience with models and supports from two national networks: YouthBuild USA, a youth and community development organization, and AmeriCorps, which engages young adults in community-based service programs. It is a project of Comprehensive Community Solutions, Inc., a Rockford, Illinois, nonprofit organization whose mission is "to bring about fundamental transformation of neighborhoods, communities, and the circumstances of those who live there."

Lessons Learned

YouthBuild Rockford provides important lessons about effective instructional strategies for developing essential workplace skills among a high-risk population with low educational and skill levels.

- At YouthBuild Rockford, opportunities to serve real community needs provide out-of-school youth with a strong motivation to learn. These learning environments use a broad range of workplace competencies.
- With effective instructional strategies, YouthBuild Rockford helps out-of-school, at-risk youth with low educational and skill levels develop essential workplace skills. Service learning, project-based learning, work-based learning, and leadership development are the primary vehicles for teaching these skills. Teaching and learning integrate: instruction in relevant competencies, opportunities to practice skills in a learning environment, opportunities to use skills to perform meaningful tasks and projects, and ongoing assessment, feedback, and reflection.

- Learning standards help YouthBuild Rockford play an important role in helping young people develop workplace competencies. The curriculum takes into account the SCANS competencies, program standards developed by YouthBuild USA, best practices from youth development programs, and local experience. The program is in the process of aligning the curriculum with the Illinois State Learning Standards, which correlate well with standards for essential workplace skills identified in the SCANS report.

- YouthBuild Rockford benefits from a blend of local experience with models and supports it gains through membership in national networks. Its core program is the model promoted and supported by YouthBuild USA, a national youth and community development organization. YouthBuild Rockford's service learning component is enhanced through participation in AmeriCorps, which engage young adults in community-based service.

Program Overview

YouthBuild Rockford enrolls an average of about 25 at-risk youth each year, providing: 1) educational activities; and 2) skills training at a construction site. It derives its budget of about $600,000 from the Illinois Department of Human Services, AmeriCorps, and the U.S. Department of Housing and Urban Development. Key program staff include the executive director, a counselor, a case manager, an education teacher for GED preparation, a community service coordinator, an employment coordinator, and two construction trainers. YouthBuild Rockford trainees receive a weekly stipend of $170 during an orientation period, which rises to $220 after 32 weeks of the formal program.

Partnerships with local agencies increase the program resources available to YouthBuild Rockford, as well as the access its students have to recreational and social services. Such partnerships have been established with Rock Valley College, the Rockford Housing Authority, Rockford YMCA, Rock River Training Corporation, and the City of Rockford. In addition, YouthBuild Rockford has developed commitments with 170 local organizations and businesses to provide students with workplace experiences.

The Orientation

The first phase of the YouthBuild Rockford program is a four-week orientation that gives staff and young people the opportunity to see if the program fits the needs of each individual. Most of the orientation participants come to the program through word of mouth and other informal avenues, although local youth-serving agencies refer about one-fourth prospective trainees/program participants to YouthBuild Rockford each year.

The orientation focuses on life skills, leadership development, and community service, along with an introduction to construction work and the basic skills it entails. Through workshops, structured group activities, one-on-one meetings with case managers, and a variety of team-building exercises, the orientation introduces and reinforces such concepts as goal setting, decision-making, problem solving, and leadership development. In the final stage of the orientation, young people attend a several-day residential retreat that addresses these concepts further.

The orientation is a trial period. At its conclusion, YouthBuild Rockford selects about three-fifths of the participants for its full program. Staff consider attendance, attitude, and punctuality in making the final selections.

The YouthBuild Rockford Program

Once selected, YouthBuild Rockford participants divide their time between educational activities (including community service) and training at a construction site. The program runs for 11 months. Each week, trainees spend two days in class followed by two days at the construction site, with community service projects on Friday mornings and Friday afternoon off.

The YouthBuild Rockford model is student-centered: that is, all elements are designed to ensure that students acquire academic knowledge, occupation-specific skills, and transferable workplace competencies. Staff assign each trainee to a team of about seven participants; the teams rotate through the different program components. In class and on the construction site, the trainee/instructor ratio is low, one instructor to a team.

Each program component addresses a clearly defined set of competencies, which form the basis for determining a trainee's progress. To graduate, trainees must complete a prescribed number of competencies in each program component. YouthBuild staff assess the completion of competencies based on the quality of the work performed, effort exhibited, values expressed, and skills developed. Each student compiles a portfolio of his or her work; a Graduation Review Panel reviews the portfolio to determine if the trainee has demonstrated sufficient progress to graduate.[21] The day after graduation, students enter the Graduate Program, a 12-month follow-up support program that is an essential component of YouthBuild Rockford.
YouthBuild Rockford considers several characteristics essential to its program:

- A Core Curriculum integrates the skills and competencies identified in the SCANS report and recognizes the wide varience in students' ability levels.

- A Case Management model provides participants with a variety of quality contacts with instructors, staff, and community experts. Also part of the model are weekly reviews that ensure a high degree of staff involvement in reinforcing achievement and tracking each person's progress toward attaining competencies, achieving goals and accountability, understanding strengths and weaknesses.

- The 11-month schedule roughly parallels the public school's, yet the program design allows for both group and individual study, punctuated by periods of recreation, independent study, and self-directed activities.

- Students advance from a large group context to small groups to individual work, emphasizing progress toward self-sufficiency.

- The program is coordinated among local education partners, trade unions, apprenticeship programs, employers, the U.S. Department of Labor's Bureau of Apprenticeship and Training, and the students themselves.

- Project-based learning provides meaningful contexts for integrating academic and work-based activities.

- Service learning and extensive community service activities provide students with meaningful links to their communities.

---

[21] Peers, staff, employer representatives, parents, and other community members sit on the Graduation Review Panel.

- Work-based learning—at construction and manufacturing sites—allows for practical application of skills developed in the various learning environments.

YouthBuild Rockford Program Components

YouthBuild Rockford students divide their time between on-site or vocational training and seven educational activities:

- Academic—Basic Academic Skill Enhancement (BASE)
- Counseling and Support Services
- Employability Training
- Leadership Development
- Life Skills
- Pre-Apprenticeship Training
- Service Learning

Upon completing the 11-month YouthBuild Rockford Program, trainees enter the Graduate Program, which provides follow-up support and resources for one year.

Teaching Essential Workplace Skills

The YouthBuild Rockford curriculum incorporates the SCANS competencies, program standards developed by YouthBuild USA, best practices from youth development programs, and local experience. Currently, YouthBuild Rockford is in the process of also aligning the curriculum with the Illinois State Learning Standards.

The curriculum provides training in all the competencies and skills identified in the SCANS report as essential for workers to succeed in today's workplace. This training takes place through a competency-based, integrated, core curriculum that imbeds three types of essential workplace skills across the components of the program:

- *The basic skills* of reading, writing, math, listening and speaking;
- *The thinking skills* of creative thinking, decision-making, problem solving, perceptions, and reasoning; and
- *The personal qualities* needed to succeed in the workplace, such as responsibility, self-esteem, sociability, self-management, and integrity and honesty.

With YouthBuild Rockford's integrated approach, many essential skills are taught across several program components. For example, in teaching the Life Skills class, the staff counselor addresses such topics as problem solving and conflict resolution through role playing, with students' practicing how they would address on-the-job problems. Often, the construction trainer helps the students put the same problem-solving techniques to the test on the construction site. When conflicts occur there, the trainer coaches students through resolving them, with debriefing and reflection time built into the process.

A Student-Centered Program

YouthBuild Rockford aims to create a positive learning environment that challenges students to learn essential academic, practical, and thinking skills. Teaching and learning focus on enabling students to progress toward each of the program's four key goals:

- Academic achievement and educational performance;
- Vocational-technical preparation and job readiness;
- Leadership development and community involvement; and
- Personal growth and development.

Effective Practices for Teaching Workplace Essential Skills

All YouthBuild Rockford Program components incorporate essential workplace skills, and many structured learning opportunities yield effective practices for teaching those skills. The strategy for helping participants develop essential workplace skills centers on five types of learning opportunity:

- Leadership development;
- Community service learning;
- Project-based learning;
- Work-based learning; and
- Employability training.

Leadership Development

Leadership Development is the process of developing young people who become increasingly successful at handling their lives, are informed about the world, are skilled in group processes, are confident in their leadership abilities, and are successful in making positive changes in their communities.

—YouthBuild Rockford

A highlight of the YouthBuild USA program is its emphasis on providing trainees with opportunities to gain leadership skills. This approach to teaching workplace essential skills is perhaps unique.

YouthBuild Rockford's leadership development activities are designed to develop three types of skill:

- *Personal development skills and knowledge:* This includes such skills as speaking and listening skills, anger management, goal setting, and understanding how to recognize, define, and analyze problems.

- *Group effectiveness skills:* These interpersonal skills include active listening, non-verbal communication, leading group discussions, and negotiation.

- *Influencing skills and community leadership:* Trainees learn about the organization of the workplace and how to influence others to serve the community.

YouthBuild Rockford builds these skills through a number of opportunities for leadership:

Leadership Development Skills class: Each week, trainees participate in this one-hour class. The Life Skills class reinforces personal development skills and knowledge skills, as does an emphasis on leadership development at the construction site.

Youth Policy Council: Through YouthBuild Rockford's Policy Council, trainees practice the leadership and interpersonal skills that are emphasized across the program. Trainees elect seven to ten representatives to the Youth Policy Council for one-year terms. The council meets once a week with the executive director and provides opportunities to learn principles of governance and decision making. Council members play an active role in staff hiring, trainee selection, event planning, and program design. For example, on behalf of the trainees, the Youth Policy Council has advocated for longer academic classes in connection with GED preparations and for a high school prom.

The National Young Leaders Conference: Group effectiveness skills are also reinforced through this YouthBuild USA event. Among other activities, the conference is the forum for electing the National Youth Leadership Council, with decision-making and other responsibilities that correspond to those of the local program councils. Trainees sit on committees on such topics as transportation, logistics, publicity, and budget. This experience requires trainees to collaborate on major decisions, solve problems to overcome obstacles, and think creatively to design an informative and engaging conference.

Crew Foremen: The construction site provides opportunities for trainees to practice and use leadership skills as crew foremen. In addition to leadership opportunities, this experience helps trainees develop communication and conflict-resolution skills. The foremen assist and supervise the construction trainers in day-to-day operations. The construction trainer chooses the first foreman for each 11-month cycle; thereafter, the trainees elect their own foremen. All trainees participate in an eight-hour foreman training taught by the trainer. A review process is used to ensure that foremen live up to expectations.

Rockford also offers trainees opportunities to practice leadership through AmeriCorps community service, job shadows and internships, and the Graduate Program.

Community Service

Serving the community is central to the YouthBuild USA program, and Rockford's blending of the YouthBuild and AmeriCorps programs furthers this emphasis. All YouthBuild Rockford trainees automatically become part-time AmeriCorps members and must complete 900 hours of community service over one year. A trainee who completes all 900 hours is eligible to receive an education award (currently $2,362), which he or she can use can to cover tuition for higher education or to repay student loans.

A major way that YouthBuild Rockford students serve the community is by rehabilitating or constructing affordable housing. In addition, trainees devote each Friday morning to community service projects. Through the program's links with community organizations and neighborhood councils, trainees actively contribute to a wide variety of efforts to address neighborhood issues. In addition to the specific service that trainees provide, this program component helps local groups see youth as a source of solutions rather than the cause of problems.

Among the community service activities that YouthBuild Rockford trainees have participated in are:

- Work with neighborhood associations to increase resident involvement, planning, and implementation of local projects and activities;
- Reading assistance and mentoring for seventy-five school children in three elementary schools; and
- Outreach services that increase knowledge of violence prevention methods for local youth.

Project-Based Learning

Project-based learning is YouthBuild Rockford's central teaching strategy: students learn about a topic through activities that involve direct investigations and other opportunities to use knowledge and skills in performing important tasks. This is central to the two days of work at the construction site each week. In addition, students work individually and in small groups, usually on projects that conclude with a final product, such as a class presentation or a construction-related product.

Project-based learning facilitates the interdisciplinary nature of the YouthBuild model. Staff from all program components address project themes to yield better-integrated projects.

YouthBuild Rockford's guiding principles for project design and implementation are the "Six A's," a framework for high-quality, problem-based learning:[22]

- **Authenticity:** Projects use a real-world context (e.g., community and workplace problems) to teach academic and professional disciplines.
- **Academic Rigor:** Projects involve students in using methods of inquiry central to academic and professional discipline(s), and require higher-order thinking skills.
- **Applied Learning:** Projects engage students in solving semi-structured problems calling for competencies expected in high-performance work organizations (e.g., teamwork, problem-solving, communication).
- **Active Exploration:** Projects extend beyond the classroom and connect to work internships, field-based investigations, and community explorations.
- **Adult Relationships:** Projects provide students with adult mentors and coaches from the wider community.

---

[22] The Six A's framework was developed by Adria Steinberg of Jobs for the Future; *see* Steinberg, Adria. 1997. *Real Learning, Real Work: School-to-Work as High School Reform.* New York: Routledge.

- **Assessment:** Projects involve students in regular exhibitions and assessments of their work in light of personal, school, and real-world standards of performance.

The Summer YouthBuilder Program exemplifies YouthBuild Rockford's use of project-based learning. With a grant from Rock River Training Corporation, YouthBuild Rockford created a summer program to develop entrepreneurial skills among JTPA-eligible youth, aged 16-18. YouthBuild staff collaborated on this effort, teaching various components that exposed students to the many aspects of starting a small business. The program began in 1999 and plans are to repeat it again in the summer of 2000, based on the availability of funding.

First, students built a knowledge base about small businesses. In their Life Skills class, for example, they learned basic entrepreneurial skills, such as opening a checking account and applying for a small business loan. To reinforce these classroom topics, students visited a local bank, where a loan officer walked them through these processes. Next, each student created, developed, and presented a small business proposal to the class. Finally, small teams drafted business plans for a company that made and sold theme-based playhouses. Students collaborated on developing a business proposal, deciding on a theme for the playhouse, designing the playhouse, and actually building a prototype.

The summer program proved to be an excellent hands-on learning experience for students, and it addressed a series of essential workplace skills: professionalism, public speaking, decision making, and analytical thinking. The completed playhouses were donated to local non-profit organizations.

Work-Based Learning

YouthBuild Rockford uses work-based learning to teach trainees about the needs and demands of real-world workplaces.

The YouthBuild model's best-known work-based learning component is the construction or rehabilitation of homes. Trainees spend half their program time on a construction site. The goals are to:

- Promote good working habits, skills development, and knowledge of the benefits of work in the construction trades;

- Prepare trainees to be aware of their ability to change and become productive people; and

- Develop a positive attitude in working with others and being proud of their accomplishments in rehabilitating urban housing.

The construction work provides trainees with hands-on experience. During the 1999-2000 program cycle, the trainees are constructing three houses from the ground up. YouthBuild Rockford is also piloting a manufacturing training career track, giving trainees the option of following either a construction or manufacturing career track.

In addition to construction-site work, each trainee participates in a two-day and four-day job shadow experience and a one-month internship. The employment coordinator matches trainees with workplaces based on career goals. YouthBuild Rockford has established commitments with 170 local organizations and businesses that provide these workplaces experiences. Once the employment coordinator identifies a workplace, trainees meet with their supervisor and sign a contract agreeing to adhere to the rules and regulations of the worksite.

Through work-based learning, trainees practice and strengthen workplace skills. Like full-time employees, the trainees punch-in and punch-out each day, reinforcing the skill of being on time. Trainees also practice the skills of following instructions, communicating effectively, and meeting employer expectations.

Some trainees do the two-day and four-day job shadows and the internship at a single workplace. In these cases, work-based learning experiences are more likely to be gateways to employment as each learning experience becomes progressively more intense in the skills and responsibilities it entails.

Employability Training

All trainees participate in an Employability class designed to improve their skill at locating, securing, and maintaining employment, taught by the Employment Coordinator. Trainees learn how to prepare a resume, complete a job application, and manage time effectively. The class stresses the importance of having the appropriate attitude and interpersonal skills. As part of the class, the coordinator prepares an extensive career plan with each student.

Because transportation can be a major barrier to retaining employment, the class covers the design of a travel plan. Usually, this part of the class takes place before students go on their job shadow or internship experiences. Students who rely on public transportation need to learn how to locate and read bus schedules to ensure they arrive at the job-shadow site on time. This is also an opportunity for students to practice time management skills so that they don't miss the bus.

Future Directions

YouthBuild Rockford has applied to Rockford Public Schools for certification as a charter school under Illinois law.[23] If this application is accepted, YouthBuild Rockford Charter School would:

- Transform the academic component of YouthBuild Rockford, making it more rigorous and challenging;
- Help address an increasing dropout rate in the Rockford Public Schools;
- Provide an expanded option for at-risk youth, given crowded alternative high schools in the community; and
- Offer a regular high school diploma, addressing internal dissatisfaction with offering only a GED.

The curriculum of YouthBuild Rockford Charter School would be aligned to the Illinois Learning Standards as well as SCANS skills. The school would enroll students from the Rockford Public Schools, as well as out-of-school youth. These students would have opportunities to participate in a challenging learning experience while acquiring the essential skills needed to succeed in the workplace.

In its application to become a charter school, YouthBuild Rockford provided an example of rigorous project-based learning that links academic competencies with both SCANS skills and Illinois academic learning standards (see Appendix D-2). For this project, students, acting as a development team, would simulate the steps to design a house, locate and develop a building site, create a budget, and obtain financing, leading up to beginning construction.

---

[23] A decision is expected early in 2000.

Contact Information:

Kerry Knodle
Executive Director
YouthBuildRockford
310 South Avon St.
Rockford, IL 61102
(815)963-6236
(815)963-1002
kknodle@mindspring.com
www.youthbuildrockford.org

Appendix D-2

This example of project-based learning comes from YouthBuild Rockford's application to become a Charter School. The example maps the skills learned to the Illinois English Language Arts learning standards; a similar mapping could be done for the remaining Illinois learning standards.

PROJECT-BASED LEARNING: AN EXAMPLE

Project: Acting as a development team, simulate steps and process to design a house, locate, and develop a site to build the house, create a budget, and obtain financing, leading up to beginning construction of the project.

Tasks

HOUSE DESIGN

- Research potential designs
- Compare and analyze models
- Select a design
- Develop blueprints and drawings
- Study building codes
- Research and select construction material

CONSTRUCTION:

- Learn process of building
- Develop PERT charts/timelines
- Write work specifications
- Hold bidders conference
- Obtain bids
- Negotiate and sign contracts

FINANCE:

- Calculate materials needed
- Cost out materials
- Develop a project budget using spreadsheets
- Calculate interest rates, mortagages
- Research funding sources and select most appropriate scenario

GOVERNMENT:

- Research zoning requirements
- Study real estate taxes
- Present project to zoning committee and City Council
- Hold neighborhood meeting

English Language Arts Competencies

- Read age-appropriate material with fluency and accuracy
- Critically evaluate information from multiple sources
- Use tables, graphs, and maps to challenge arguments, defend conclusions, and persude others
- Using contemporary technology, produce documents of publication quality for specific purposes and audiences; exhibit clarity of focus, logic of organization, appropriate elaboration and support, and overall coherence
- Write for real or potentially real situations in academic, professional, and civic contexts
- Apply listening skills as individuals and members of a group in a variety of settings
- Apply listening skills in practical settings
- Deliver planned and impromptu oral presentations, as individuals and members of a group, conveying results of research, projects or literature studies to a variety of audiences using appropriate visual aid and available technology
- Use speaking skills to participate in and lead group discussions; analyze the effectiveness of the spoken interactions based upon the ability of the group to achieve its goals
- Implement learned strategies to self-monitor communication and to resolve individual, group, and workplace conflict
- Develop a research plan using multiple forms of data
- Research, design, and present a project to an academic, business or school community audience on topic selected from among contemporary issues
- Using contemporary technology, create a research presentation or prepare a documentary related to academic, technical or occupational topics and present the findings in oral or multimedia formats

Appendix E

Technical Panel Members

Technical Expert Panel Members

Member	**Affiliation**
Karl Botterbusch	University of Wisconsin - Stout
Pam LaConte	George Washington University
Judith Norback	Center for Skills Enhancement, Inc.
Gary Standridge	University of Arkansas
Susan Conway	NCR
Beverly Nash	Georgia Department of Education
Marlene Seltzer	Jobs for the Future
Joseph Barela	Arapahoe/Douglas Works!
Ron Rodriguez	Houston Works
Bryan Stone	First Coast Workforce Development Board, Inc.
Andrew Wiegand	Social Policy Research Associates
Gary Moore	Maryland Department of Labor
John Smith	Department of Labor, Region VI
Russell Thomlin	Houston Works

U.S. Department of Labor
Employment and Training Administration
200 Constitution Avenue
Washington, D.C. 20210

Official Business
Penalty for Private Use, $300

Presorted Standard

Postage and Fees Paid
U.S. Department of Labor
Permit No. G-755